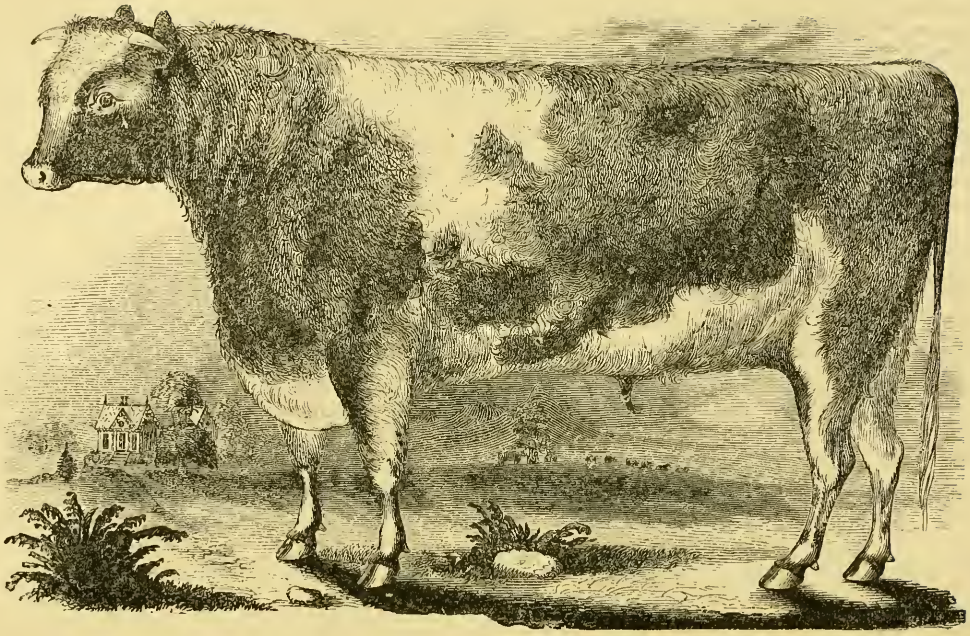

SHORT-HORN, "DOUBLE DUKE," (1,451½ A. H. B.,) owned by the Harvest Club, Springfield. See Preface to Abstract.

SIXTH ANNUAL REPORT

OF THE

SECRETARY

OF THE

Massachusetts Board of Agriculture,

TOGETHER WITH

REPORTS OF COMMITTEES

APPOINTED TO VISIT THE COUNTY SOCIETIES,

WITH AN APPENDIX

CONTAINING AN ABSTRACT OF THE

FINANCES OF THE COUNTY SOCIETIES.

BOSTON:
WILLIAM WHITE, PRINTER TO THE STATE.
1859.

STATE BOARD OF AGRICULTURE.

1859.

MEMBERS EX OFFICIIS.

His Excellency NATHANIEL P. BANKS.
His Honor ELIPHALET TRASK.
Hon. OLIVER WARNER, *Secretary of State.*

APPOINTED BY THE GOVERNOR AND COUNCIL.

EPHRAIM W. BULL, *of Concord.*
MARSHALL P. WILDER, *of Dorchester.*
WILLIAM S. CLARK, *of Amherst.*

MEMBERS CHOSEN BY THE SOCIETIES.

Massachusetts,	RICHARD S. FAY, *of Boston.*
Essex,	WILLIAM SUTTON, *of South Danvers.*
Middlesex,	SIMON BROWN, *of Concord.*
Middlesex, South,	WILLIAM G. LEWIS, *of Framingham.*
Middlesex, North,	JOHN C. BARTLETT, *of Chelmsford.*
Worcester,	JOHN BROOKS, *of Princeton.*
Worcester, West,	JOSIAH WHITE, *of Petersham.*
Worcester, North,	JABEZ FISHER, *of Fitchburg.*
Worcester, South,	OLIVER C. FELTON, *of Brookfield.*
Hampshire, Franklin and Hampden,	PAOLI LATHROP, *of South Hadley.*
Hampshire,	LEVI STOCKBRIDGE, *of Hadley.*
Hampden,	GEORGE M. ATWATER, *of Springfield.*
Hampden, East,	CYRUS KNOX, *of Palmer.*
Franklin,	JAMES S. GRENNELL, *of Greenfield.*
Berkshire,	CHARLES K. TRACY *of Hinsdale.*
Housatonic,	SAMUEL H. BUSHNELL, *of Sheffield.*
Norfolk,	CHARLES C. SEWALL, *of Medfield.*
Bristol,	NATHAN DURFEE, *of Fall River.*
Plymouth,	CHARLES G. DAVIS, *of Plymouth.*
Barnstable,	GEORGE MARSTON, *of Barnstable.*
Nantucket,	EDWARD W. GARDNER, *of Nantucket.*

CHARLES L. FLINT, *Secretary.*

SIXTH ANNUAL REPORT

OF THE

SECRETARY

OF THE

BOARD OF AGRICULTURE.

To the Senate and House of Representatives of the Commonwealth of Massachusetts :—

In presenting this Report it is proper to say, that the contract between the Board of Agriculture and the Trustees of the State Reform School at Westborough, will expire by limitation, on the 1st of April, 1859. This contract, by which the farm connected with that school was placed under the charge of the Board of Agriculture, was made in March, 1854, at the joint request of the two Boards. By it the farm was to be carried on under the direction of the Board of Agriculture, to supply the institution with milk, vegetables, beef, pork, and other produce, such as the interests of the school might require, to employ the labor of the boys, purchase the offal of the institution, &c. A systematic debt and credit account was to be kept between the farm and the school, the Board crediting the school with the labor of the boys, at ten cents a day of six hours, each, and with the sum of three hundred and fifty dollars a year for the offal, and charging it with the produce of the farm, at the usual prices in the neighborhood, with labor performed for the institution, &c.

The terms of this contract have been faithfully carried out by both parties. The Board of Agriculture has cleared for the State, on an average, over a thousand dollars a year, or more than five thousand dollars during the period of its occupancy

of the farm, while the Trustees, relieved from burdensome care of so large a farm, have, it is believed, instilled a far greater efficiency into the management of the affairs of the institution under their charge, so that the Commonwealth has been the gainer in every respect.

In order to give a more distinct idea of the comparative operations of the Board at the farm, it may not be improper to allude to the amount of earnings of the boys, previous to and since the time when the Board assumed the control of the farm. This comparison is not made to disparage the manner in which the farm was managed before it came into the hands of the Board, but simply to show that the management of the farm by the Board of Agriculture has been as judicious as could be expected from any body of men, and for the interests of the Commonwealth. It will appear from the following statistics, that gross misrepresentations have from time to time been made, with regard to the expenditures of the public money and the operations on the farm, though it should be said to the credit of the people, and of the members of the legislatures which have made the requisite appropriations for the farm, that the misrepresentations referred to had little or no influence on their action.

By an examination of the reports of the State Reform School for the five years previous to 1854, when the Board, at the request of the Trustees, assumed the management of the farm, it appears that the whole amount earned by the boys was less in proportion than during the five years since 1854, or the comparison may be stated as follows:—

YEAR.	Whole amount earned by the Boys.	No. of Boys employed on Farm.	No. of Boys in Shoe Shop.	Average No of Boys the School.
1849, ...	$1,598 58	44	105	334.0
1850, ...	3,426 20	50	100	309.0
1851, ...	4,639 37	59	117	324.0
1852, ...	3,072 42	65	98	318.8
1853, ...	4,015 49	48	147	341.8
Totals, ...	$16,752 06	266	567	1,627.6

The farm came into the hands of the Board in 1854, and since that time the number of boys worked on the farm has varied, according to agreements made between the two boards, from fifty to one hundred and fifty for the summer months. The statement may be continued as follows:—

YEAR.	Total amount earned by the Boys.	No. of Boys employed on Farm.	No. of Boys in Shoe Shop.	Average No of Boys in the School.
1854, ...	$6,753 06	47.5	210	472.0
1855, ...	7,835 02	94.4	140	562.0
1856, ...	6,017 72	77.6	154	569.0
1857, ...	5,610 57	92.8	224.8	580.5
1858, ...	3,456 50	51.0	91.0	589.8
Totals, ...	$29,672 87	363.3	849.8	2,773.3

Of the above amount of aggregate earnings of the boys, the Board of Agriculture paid to the Trustees of the School, for boys' labor, the following sums:—

In 1854, ...	$1,902 05
1855, ...	1,998 30
1856, ...	1,993 60
1857, ...	1,961 60
1858, ...	1,582 20
	$9,437 75

If we deduct this amount from the $29,672.87, the aggregate amount credited by the Trustees to the earnings of the boys, we have $20,235.12 earned by the boys in the shoe and chair shop, which is $23.81 for each boy annually in the shop, against $25.98 annually for each boy on the farm, or $2.17 each more than the boys in the shoe shop.

During the five years, including 1849–53, the boys working on the farm and in the shop, earned $20.11 a year each, and during the five years including 1854–58, the boys working on

the farm and in the shoe shop, each earned $24.46 a year, or $4.35 a year, for each boy, more than during the first period.

So far, therefore, as the interest of the State is affected, it is apparent that greatly increased efficiency marked the management of the institution during the five years since the Board took charge of the farm, and that the proportional earnings of the boys were considerably increased.

If now we consider the comparative amount of produce raised on the farm and supplied to the institution, during the five years preceding the occupancy of the Board, and the five years since, we shall find the results to be as follows:—

In 1849,	the	quantity of	milk was	6,641	gallons.
1850,	"	"	"	5,182	"
1851,	"	"	"	6,494	"
1852,	"	"	"	5,839	"
1853,	"	"	"	6,265	"
				30,421	gallons.

And in addition to this, in 1850 there were 642½ pounds of butter made; in 1851, 964¾ lbs.; in 1852, 877 lbs.; making, in all, 2,484¼ lbs. During this period of five years, therefore, when the farm furnished the school 30,421 gallons of milk, at least 6,210$\frac{62}{100}$ gallons must have been skimmed. During the period, from 1854 to 1858 inclusive, the Board of Agriculture furnished the school with 40,721 gallons of milk as it came from the cow. If the making of butter had been allowed, this milk, at ten quarts to the pound, would have made 16,288$\frac{4}{10}$ lbs., but the boys would have had skimmed instead of new milk. The annual supply of milk from the farm was as follows:—

In 1854, ...	6,469½	gallons.
1855, ...	7,848½	"
1856, ...	8,964	"
1857, ...	7,858	"
1858, ...	9,581	"
	40,721	gallons.

It will be perceived, therefore, that the capacity of the farm, in this respect, has been considerably increased, though, no doubt, true economy would dictate the purchase of more land, for the purpose of keeping a larger number of cows than the farm will even now maintain. This was a prominent object which the Board had in view, in asking an appropriation for the purchase of land in 1855, under the impression that, though the time would come when the present extent of land would be sufficient to furnish full supplies of milk, it was for the interest of the State to increase these supplies at once, as being the cheapest and healthiest food for the inmates of the institution.

The change has not been less marked in the quantity of beef and pork supplied from the farm. The quantity of beef and pork furnished was as follows: In

	Beef.	Pork.
1849, ...	1,155 lbs.	2,398 lbs.
1850, ...	2,849 "	4,329 "
1851, ...	4,721 "	3,121 "
1852, ...	2,870 "	5,306 "
1853, ...	8,828 "	–
	20,423 lbs.	15,154 lbs.

The quantities of beef and pork produced by the farm during the five years of the occupancy of the Board, were as follows:

	Beef.	Pork.
1854, ...	7,313 lbs.	6,165 lbs.
1855, ...	7,617½ "	5,744 "
1856, ...	6,594 "	9,844 "
1857, ...	8,903 "	6,400 "
1858, ...	5,452 "	10,040 "
	35,909½ lbs.	38,193 lbs.

From this it appears, that during the five years past the farm has produced 15,486½ lbs. of beef and 23,039 lbs. of pork more than it did during the five years, from 1849 to 1853 inclusive, showing a very largely increased capacity in this respect also.

And so the yield of ordinary farm produce might and ought to be taken into account, in arriving at a conclusion as to what the Board has accomplished during the five years just past. The yield of some of these crops was as follows:—

	Indian Corn.	Hay.	Grain.
1849, . . .	470 bush.	37 tons.	154½ bush.
1850, . . .	800 "	60 "	127 "
1851, . . .	684 "	65 "	55 "
1852, . . .	1,125 "	35 "	100 "
1853, . . .	500 "	35 "	100 "
	——3,579 bush.	—232 tons.	——536½ bush.
1854, . . .	900 bush.	43 tons.	00 bush.
1855, . . .	982 "	72 "	500 "
1856, . . .	1,470 "	68 "	90 "
1857, . . .	1,000 "	80 "	51 "
1858, . . .	536 "	81 "	100 "
	——4,888 bush.	—344 tons.	——741 bush.

In the above statement, no crops except those produced by the management of the farm, are included.

It appears from the above, that the farm has produced 1,309 bushels of Indian corn, 112 tons of English hay, and 204½ bushels of wheat, rye and oats, more, since the farm came into the hands of the Board than it did the five years previous, or a money value of at least $637 a year greater in these crops alone during the last five years, than during the five preceding years. This large increase of crops is fairly due to the increased capacities of the farm, since, as already shown, the other products, as milk, beef, pork, &c., have also increased rather than diminished under the management of the Board.

But the practical management of the farm is by no means the extent of the operations of the Board. When the farm came into their charge many permanent improvements were absolutely required, some of which admitted of little delay, to say nothing of the necessity of carrying on these improvements as a means of employing the large number of boys which the Board had agreed to work and pay for at the rate of ten cents a day of six hours.

The amount expended for these improvements in 1854, was $4,935.09. Of this sum, $2,032.62 was paid for building a piggery, slaughter-house and store-house; $1,066.35 for building a grainery, sheds, &c.; and $1,836.02 for the labor of boys and teams in laying walls, removing stones, &c.; all of which sums were imperatively required as subsequent experience has clearly shown. And these expenditures were needed and must have

been made by the State, even if the Board of Agriculture had not assumed the control of them.

In 1855, a reservoir being required for receiving and economizing the waste from the institution, a large sum was necessarily spent in building a permanent structure, in the location of which the Board acted with the concurrence of the Trustees of the institution, and this, together with trenching and improvements in what is called the Warren lot, undertaken partly with the design of furnishing labor and employment for the boys, and preparing a suitable place for an orchard, and the laying of wall, amounted to $3,349.10, as the permanent improvement account for that year.

In 1856, the trenching of a garden lot was undertaken for a similar purpose, to furnish employment for a large number of boys not needed at all times in the immediate working of the farm, and the amount spent for this labor and for drain tiles, laying wall, &c., was no less than $2,190.54. In 1857, the trenching of the garden and the Warren lot was continued, the former piece being completed and the latter considerably advanced, and for labors of this description, all of which effected valuable permanent improvements, the sum of $1,957.16 was spent; and in 1858, the permanent improvements have consisted of gravelling garden walks, removing stones in the Warren lot, setting apple and pear trees, and laying stone wall, and have amounted to $1,331.02. So that the aggregate amount for permanent improvements during the past five years, has been no less than $13,762.91, while the aggregate amount for boys' labor was $9,437.75; and for swill, $1,750; and sundries, $49.34; making, in all, $11,237.29. The value of personal property, as will appear by the inventories in the Appendix, to which reference is respectfully made, is $5,177.84 greater than when the Board first took charge of the farm, or in other words, the Board leave that amount of personal property belonging to the State, over and above the aggregate amount received from the Trustees in 1854. The sum spent for permanent improvements, for the labor of the boys, the increase in inventory, in implements, stock, &c., amounts, during the five years, to $34,258.84. The aggregate amount received from the Commonwealth during the same time, including the value of the inventory received from the Trustees in 1854,

was $29,081, showing a balance of $5,177.84 which the farm returns to the State more than the whole amount received.

The amount paid out for permanent improvements may appear to be large, but the fact already alluded to, that many of these improvements were undertaken for the purpose of furnishing out-door work for so large a number of the boys in the school, will sufficiently explain it. Every farmer knows that it is impossible to employ the labor of from seventy to one hundred and fifty boys throughout the season in the culture of the ordinary farm crops. A few days might occur during the season of weeding or harvesting, when, on a very large farm, that number might be furnished with work, but those days would be rare. There is an old adage among the farmers in the western part of England, which is quite applicable here: "one boy is a boy, two boys are half a boy, and three boys are no boy at all."

Could the Board have taken ten, fifteen or twenty boys, instead of seventy-five, one hundred and one hundred and fifty, the aggregate amount charged to labor and permanent improvements would have been far less. The experience of the last five years has proved beyond the possibility of a doubt, that, so far from being worth ten cents a day each to the farm, this very large number has been worth far less than half that amount, and it is not, perhaps, too much to say that it has been an absolute cost, without any adequate return.

The labor of a few boys on the farm might be made valuable. The farm could better afford to pay twenty-five cents each per day of six hours for the labor of ten good boys, than it could to take a hundred, from the ages of ten to fourteen, for nothing, and agree to keep a careful and instructive supervision over them. To superintend this hundred, in work on any ordinary farm crops, and taking the season through, at least three good and intelligent men would be required at a cost, considerably above the average cost of common farm labor. The time of these three men, for at least six or seven hours of the day, would be nearly worthless for any other purpose than merely to superintend the boys. The amount of work which they could do themselves, would be but trifling. This would ordinarily be the case, even with so large a number of good boys, all disposed to work and do their duty, if the object were

to teach them how to work. But especially would it be the case if all the hundred were of a class sent to a school for reformation, and committed for criminal or juvenile offences.

This has been precisely the case at the farm during the last five years. The estimates on a preceding page, of the amount *earned* by the boys on the farm, are based on the rate of ten cents a day, which is the amount agreed upon between the Board of Agriculture and the trustees of the school, by the original contract made in 1854. That amount seems, at first sight, to be small, but, in point of fact, as already intimated, it was far more than double what the labor, under all the circumstances, was worth to the farm.

Moreover, it is to be borne in mind, that in the vicinity of a public institution, something is required for ornament: that is, in making improvements the prospective wants of the State must be kept constantly in view. On an ordinary farm, for example, a common balance wall would answer every purpose of a fence, but no one, with a proper knowledge of the circumstances of the State Farm at Westboro', would question the propriety of building good face walls, though the present expense might be a little more. In fact, the Board would have subjected itself to far more just and severe censure for disregarding the future wants of the farm and the State, and half doing whatever was undertaken, than it has from having done things as they ought to have been done ; for in the first case, those who were capable of appreciating aright the position of a great public institution and the credit of the State, would have had just cause of dissatisfaction, while in the latter, only those who are ill-advised or incapable of estimating what has actually been accomplished, have been inclined to find fault.

With respect to the details of the operations of the past year, the committee chosen to superintend the management of the farm laid out the work as follows:—

CROPS ON THE PLAIN.

Oats.—Sow eight acres of oats, seeded with clover. Use one hundred pounds of plaster per acre, sown with the seed and harrowed in, on seven acres, leaving an average acre without plaster. Use on two acres two bushels of seed, on two, three bushels, on two, four bushels, and on two, five bushels. Let these four lots

of two acres each run lengthwise of the whole piece, and the one acre without plaster run cross-wise through all the lots.

Onions.—Sow one acre with onions, manured with six cords of barn manure, fifty bushels leached ashes, and one hundred pounds of plaster. The ashes and plaster to be spread and cultivated in, the ashes to go over the whole acre, making a memorandum of the bounds for experiment.

Turnips.—Four acres. Spread twenty cords of barn manure and cultivate it in. On one acre put twenty-five bushels ashes, one hundred twenty-five pounds plaster, fifty pounds bone dust, and sow ruta-bagas, (River's stubble Swede) ; the bone dust to be put in the drill. One acre purple top strap leaf in drill, sown as early as the ground is suitable, manured as above. This crop to be followed by a second crop of the same turnip. The third and fourth acres sow with oats for soiling, and follow the oats with purple top strap leaf, using twenty-five bushels ashes per acre ; on one acre a dollar's worth of plaster and on the other a dollar's worth of bone-dust in the drill.

Carrots.—Two acres, manured with twelve cords barn manure cultivated in, and fifty bushels ashes per acre harrowed in, and on one acre one hundred pounds plaster harrowed or brushed in with the ashes. Time of sowing to be as early as practicable.

Beets.—Two acres, manured with twelve cords barn manure broadcast, cultivated in, and one hundred bushels ashes, and on one acre one hundred pounds plaster harrowed or brushed in.

Corn Fodder.—On one acre, manured with four cords barn manure spread and harrowed in ; one-half of it to be sown with Stowell's evergreen, the other with Southern corn.

Millet.—One acre manured with four cords of barn manure spread and cultivated in.

Potatoes.—Four acres, manured with five cords per acre of barn manure spread and cultivated in. Number these acres, 1, 2, 3, and 4. On number 1, put Jersey marl in the hill ; on number 2, put ten bushels ashes in the hill ; on numbers 3 and 4, the same quanty of ashes per acre, and one hundred pounds plaster to the acre. Use Davis's seedling variety on the whole.

Indian Corn.—Four acres manured with seven and a half cords per acre of barn manure cultivated in, ten bushels of

ashes, and one hundred pounds of plaster, at the first hoeing. Alternate rows throughout the whole field, planted in hill and drill three feet apart. Hills three feet apart in the row, four kernels to be left in the hill, and the stalks left nine inches apart in the drills. Be particular to plant the seeds at exact distances in the drill, and to leave the same number of stalks in a row of drill as in a row of hill. Use Brigham corn on the whole.

Beans.—Two acres. Put three hundred pounds plaster and twenty-five bushels ashes on one acre in the drill, and three hundred pounds plaster only in the other.

Vegetables and Sweet Corn.—Three acres. Use thirty cords barn manure, spread and cultivated in, and one hundred bushels ashes and three hundred pounds of plaster.

SIBLEY LOT.

Indian Corn.—Six acres; forty-five cords of barn manure and sixty bushels ashes, and six hundred pounds plaster, mixed and put in the hill. (Cutting stalks at harvesting to be considered hereafter.)

Potatoes.—Eight acres green sward on Sibley lot, ploughed and manured with ashes, plaster and super-phosphate of lime. Two acres ashes and plaster, two acres super-phosphate and plaster, two acres super-phosphate alone, and two acres ashes alone, leaving a strip entirely unmanured.

WARREN LOT.

Potatoes.—Four acres, under the special care of Messrs. Bartlett and Fisher to experiment on.

Indian Corn.—Two acres. Fifteen cords barn manure broadcast and cultivated in, twenty bushels ashes and two hundred pounds plaster. Use tips, middles and butts in alternate rows, taking for tips three inches, or a little less than one-third of the ear, and for butts three inches, and the rest use as middles.

VEGETABLE GARDEN.

Onions.—One acre. Six cords barnyard scrapings, fifty bushels ashes, and one hundred pounds plaster on one-half of it, and none on the other; the ashes over the whole.

Cabbages.—One acre. Use eight cords barn yard manure cultivated in, fifty bushels ashes, two hundred pounds bone dust brushed in.

Parsnips.—Half an acre manured as above.

Squashes.—Half an acre, marrow variety, manured as above.

FRONT OF INSTITUTION.

Cabbages.—Half an acre sown broadcast.

Strawberries.—Three-fourths of an acre.

Garden Sauce.—Manured at discretion.

BELOW THE VEGETABLE GARDEN.

Indian Corn.—Two acres to be sown in drill for fodder. Use eight cords piggery manure, six hundred pounds DeBurg's super-phosphate per acre, one-half in the drill and one-half at first hoeing.

FRONT OF THE FARM HOUSE.

Barley.—One acre and a half manured heavily and seeded down.

GARDEN WEST OF THE INSTITUTION.

Wheat.—One acre and a half sown with wheat and manured at discretion.

At the annual meeting held January 18th, 1859, the Superintending Committee of the farm submitted the following

REPORT.

The committee commenced the farm operations of the past year by an inquiry into the probable wants of the institution, and after mature consideration, laid out the spring and summer's work according to them.

They directed that the lot known as the rye field, should be sown with oats, in four lots of two acres each. The chairman, however, on a careful survey of the piece, found it to contain but six acres. It was, in consequence, necessary to reduce the size of the lots to an acre and a half each. The oats were sown broadcast on the 27th and 28th days of April, and harrowed in as follows: No. 1 was seeded at the rate of five bushels per acre; No. 2 at the rate of four bushels; No. 3 at the rate

of three bushels; and No. 4 at the rate of two bushels. The lots were manured with 100 pounds of plaster per acre, spread broadcast and harrowed in, with the exception of a strip of one acre running across the several lots, which received no plaster. The oats were harvested on the 28th of July, and thrashed on the 2d and 3d days of September. The yield of lot No. 1 was 42 bushels; that of No. 2 was 35½ bushels; that of No. 3, 40 bushels; that of No. 4, 26½ bushels. The acre that received no plaster yielded 20½ bushels, the grain weighing 28 pounds to the bushel, and being much the same on all the lots except on No. 1, on which both the grain and straw were much the lightest.

ONIONS.

The committee directed that two acres of onions be sown—one on the plain and one on the vegetable garden. The acre on the plain was manured with 6 cords of barnyard manure, 50 bushels of leached ashes, and 100 pounds of plaster. The manure and ashes were spread broadcast over the whole acre, and cultivated in, while the plaster was spread on half the acre and cultivated in. The onion seed was sown April 24, and cultivated five or six times during the season. On being harvested on the 8th day of October, the yield was found to be 350½ bushels. The half acre that received the plaster, produced 180½ bushels, or 26½ bushels more than the half acre that received no plaster.

The acre in the vegetable garden was sown April 16, manured with 6 cords of barnyard scrapings, 100 bushels of leached ashes, and 100 pounds of plaster. The manure and ashes were spread over the whole acre, the plaster only on half, and the whole was cultivated in. The lot was cultivated during the season, the same as that on the plain, and the crop was harvested on the 24th of September, the yield being 358½ bushels. The half that received the plaster yielded 198½ bushels, or 38½ bushels more than the half acre that received no plaster. This acre received 50 bushels more leached ashes than that on the plain, and yielded but six bushels more.

The land in the garden had been recently trenched, in consequence of which the soil and subsoil had not been intimately mixed.

TURNIPS.

Four acres were cultivated with turnips on the plain, two of them being manured with 10 cords of horse manure, 50 bushels leached ashes, 150 pounds of plaster and 50 pounds of bone, all of which were cultivated in. One acre was seeded with the purple top strap leaf, on the 7th day of May, and hoed and thinned out in the course of the summer, and yielded 930 bushels.

Another acre was seeded with River's stubble Swede, on the 8th day of June, and cultivated and thinned the same as the first, and yielded 590 bushels. On one-fourth of each of these acres $12\frac{1}{2}$ pounds of bone meal, dissolved in 10 pounds of sulphuric acid, were drilled in with the seed, and the yield of this one-fourth acre of purple top was 230 bushels, and of the River's stubble 150 bushels; the crops on both these one-fourth acre lots appearing somewhat more vigorous in the early part of the season than on the parts which did not receive the bone meal or super-phosphate of lime, and they came to maturity earlier, but the purple top produced only $1\frac{3}{4}$ bushels more, and the River's stubble only $2\frac{1}{2}$ bushels more than the two quarters of the acre on which the same quantity of bone meal was drilled in undissolved.

Two of these four acres were seeded with oats on the 28th of April, and harvested July 28, and the stubble was ploughed in on July 29, and sown with the purple top strap leaf turnips on August 5, but the crop failed: the two acres yielding only 25 bushels.

CARROTS.

Two acres of carrots on the plain, were manured with 12 cords barn manure and 100 bushels leached ashes. One of them received, also, 100 pounds of plaster, and the whole was cultivated in, three pounds of seed being used to the acre. The carrots were weeded on the 27th of May, cultivated two or three times, and harvested on the 10th, 11th, and 12th of November; the acre which received the plaster yielding 590 bushels of 50 pounds each, equal to 14 tons; the other acre yielding 516 bushels or $12\frac{9}{10}$ tons, or 2,200 pounds less than the acre which received the 100 pounds of plaster.

BEETS.

Two acres on the plain were sown with beets, manured with 6 cords of barn manure and 50 bushels of leached ashes per acre. On one acre, also, 100 pounds of plaster were spread, and the whole cultivated in. Four pounds of the white sugar beet seed were sown the 29th of May. They were cultivated and weeded, the same as the other root crops, and harvested on the 4th and 5th days of November. The acre which received the plaster yielded 234 bushels, or five tons and 1,700 pounds. The acre without plaster produced 202 bushels, or five tons 100 pounds, 1,600 pounds less than the acre manured with the additional 100 pounds of plaster. The beet seed proved to be of poor quality. The ground was ploughed when rather heavy, and remained heavy through the season. From these, and perhaps other causes, the crop may be regarded as a failure.

FODDER CORN.

Four acres were planted with fodder corn, three of which were near the barn and the other on the plain. They were all manured with compost from the piggery. The piece near the barn was sown in the drill on May 17, three bushels of southern seed being used, and two of Stowell's evergreen corn. It all came up well, and was cultivated in the usual manner, yielded a heavy crop, which was cut up from time to time, from July 25 to October 15, and fed to the cows. The portion of this piece planted with southern corn, yielded the largest crop, and the cows relished it well, but appeared to prefer the evergreen, which, on the whole, we consider best for sowing for green fodder. The acre on the plain was sown in the drill June 18, two bushels of the yellow northern corn being used. It was cultivated the same as the three acres before mentioned, and produced a good crop. It not being required to feed out green, it was cured for winter use.

MILLET.

An acre and a half, on the plain, was sown with millet, manured with four cords of horse manure to the acre, cultivated in, twelve quarts of seed being sown broadcast on May 25. On the 13th of August, when in blossom, it was cut for hay, and after being well cured, weighed 2,666 pounds. This crop was small, but, considering the light, sandy character of the soil, it was as heavy as could be expected.

POTATOES.

Four acres, on the plain, were planted with the Davis seedling, on the 2d of June, manured at the rate of five cords of compost from the reservoir, per acre, spread broadcast and cultivated in. In addition to this manure, acre No. 1 had 10 bushels of leached ashes, or about a gill put in the hill. Acres Nos. 2 and 3, had each 10 bushels of leached ashes and 100 pounds of plaster mixed and put in the hill, and on one-third of acre No. 4, a pint of Jersey marl was put in each hill, on another third a pint of leached ashes, and the remaining third was planted without any additional manure in the hill. These potatoes were all hoed three times, and cultivated in the usual manner through the season. Acre No. 1 was harvested October 9, and yielded 109½ bushels. Acre No. 2, harvested the same day, yielded 94½ bushels. No. 3, dug October 11, yielded 92 bushels. Acres No. 2 and 3, which received 100 pounds of plaster in addition to the other manure and ashes, which was the same as No. 1 received, yielded, respectively, 15 bushels and 17½ bushels less than No. 1. The land may be slightly

better on acre No. 1, owing to its lying near the wall, acres No. 2 and 3 lying at a distance from it, but the mixture of plaster and ashes in the hill on Nos. 2 and 3, may be a further reason for the reduced crop.

On two rows of the potatoes planted with Jersey marl in the hill, an equal quantity of seed was taken for each. In one of these rows the seed was cut and planted in the drill, and in the other the seed was planted uncut, in the hill. Both rows received the same quantity of marl, and the row planted in the drill yielded $\frac{11}{16}$ths of a bushel more than the row in hills.

The third of acre No. 4 manured with Jersey marl in the hill, yielded $32\frac{1}{16}$ bushels; the third manured with ashes in the hill, yielded $28\frac{1}{2}$ bushels; and the third without manure in the hill, yielded 31 bushels.

Six and a half acres, in the Sibley lot, so called, were planted with potatoes, the land being broken up about the 15th of April. One acre and a half was manured with 15 bushels of leached ashes in the hill, and planted May 22, with 8 bushels of black potatoes to the acre. They were dug September 27, and measured 187 bushels.

One acre and a half was manured with 150 pounds of plaster and 15 bushels leached ashes mixed and put in the hill, and planted on May 22 and 23, with 8 bushels per acre of Dover potatoes; dug September 28, and yielded 167 bushels.

One acre and a half was manured with super-phosphate of lime, at the rate of 150 pounds per acre, mixed with 100 pounds plaster in the hill, and planted May 22, with eight bushels Lincoln seedling potatoes per acre. They were dug September 29, and yielded 232 bushels.

An acre and a half of this lot was manured with 450 pounds of Coe's super-phosphate per acre, and planted on the 22d and 23d of May, with 8 bushels of the State of Maine potato per acre. The crop when dug on September 13, gave 230 bushels.

An acre and a half of this lot was planted on the 22d and 23d of May, without manure of any kind, the seed used being known as the Maine seedling. They were dug September 13, and yielded 89 bushels.

INDIAN CORN.

Four acres, on the plain, were planted with Indian corn, manured with seven and a half cords of barn manure per acre, spread broadcast and cultivated in, and 10 bushels of leached ashes mixed with 100 pounds of plaster, per acre, put around the corn at the time of the first hoeing. The seed was the variety known as the Brigham corn, and was planted June 1, in alternate rows of hills and drills, the rows three feet apart, and the hills in the rows three feet apart. The rows in the

drills were planted with four grains for every three feet, or nine inches apart. The corn was thinned at the first hoeing, and an equal number of stalks left standing in each row. The four acres were hoed three times, and looked well through the season. One-half the piece was cut up by the roots and stooked on the 15th of September, husked, housed and weighed on the 18th and 20th of October, and yielded as follows: The part planted in hills, 2,276 pounds of corn on the ear, and 2,950 pounds of stover. The part planted in drills yielded 2,700 pounds of corn on the ear, and 3,270 pounds of stover. The part planted in drills yielded 324 pounds of corn on the ear, and 320 pounds of stover more than that planted in hills. The other half of the field was topped on the 18th of September, the tops bound and stooked, remaining in the stook till October 20, when the corn was cut, husked and weighed. The part planted in hills produced 2,170 pounds of corn on the ear. The tops and butts weighed 3,020 pounds.

The rows planted in drills on this part of the field, produced 2,505 pounds of corn on the ear, and 3,390 pounds of stover. The drilled rows on this part of the field yielded 335 pounds of corn on the ear, and 370 pounds of stover more than the rows planted in hills. That half of these four acres planted in drills, produced 659 pounds of corn on the ear, and 690 pounds of stover more than the half planted in hills.

From an examination of the weights given above, it appears, that the corn on the ear, on that part which was cut up by the roots and stooked, weighed 401 pounds more, and the stover 190 less than that which was topped. This apparent anomaly is accounted for by the fact, that when corn is cut up by the roots and stooked, the stover becomes dryer and the ears dry less than when topped.

The two acres of corn planted on the plain, and manured with 7½ cords of barn manure to the acre, spread and cultivated in, 10 bushels of leached ashes and 100 pounds of plaster, per acre, in the hill, were planted June 3, in alternate rows, with seed taken from the butts, middles and tips of the ears. This corn was hoed three times in the course of the summer. One of the acres, through the inadvertency of the head farmer at the time of harvesting, was cut up and stooked all together. When husked on the 18th of October, the yield of corn on the ear was 2,660 pounds, the stover weighing 3,270 pounds.

The other acre was stooked separate, and was husked on the 19th of October. The rows planted with seed taken from the butts of the ears, yielded 738 pounds of sound and 77 pounds of soft corn on the ear, and 1,360 pounds of stover.

The seed taken from the tips yielded 747 pounds of sound and 53 pounds of soft corn on the ear, and 1,320 pounds of

stover. On comparing the crops grown on this field and estimating the sound corn and the stover at seven dollars the ton, it will be found that the value of the crops produced by the rows planted with seed taken from the butts, was:—

Of sound corn, 738 pounds, which, at 1 cent,	. .	$7 38
soft " 77 " " ½ "	. .	39
stover, 1,360 " " at $7 a ton,	. .	4 76
Total,	. . . .	$12 53

The value of the produce of the rows seeded from the middle of the ears, was:—

Of sound corn, 663 pounds, at 1 cent,	. . .	$6 63
soft " 164 " at ½ "	. . .	82
stover, 1,290 " at $7 the ton,	. . .	4 51
Whole value,	. . . . .	$11 96

The value of the produce of the rows seeded from the tips of the ears, was:—

Of sound corn, 747 pounds, at 1 cent,	. . .	$7 47
soft " 53 " at ½ "	. . .	27
stover, 1,320 " at $7 the ton,	. . .	4 62
Whole value,	. . . . . .	$12 36

So that the butts produced the most, the tips the next, and the middles the least money value; while the tips produced the most, the butts the next, and the middles least sound corn; and middles produced the most, the butts the next, and the tips the least soft corn. It is difficult to determine by this experiment, from what part of the ear the seed should be taken. Probably a mixture of the grains of the whole ear, being most natural, would be the best.

Six acres of corn on the Sibley lot, were manured with forty-five cords of barn manure spread and cultivated in, and sixty bushels of leached ashes, and six hundred pounds of plaster mixed and put in the hill; the ground was ploughed about the middle, and planted on the 20th of May. It was hoed three times, at proper intervals, and was cut up by the roots, stooked September 15, and husked on the 7th of October, producing 432 bushels of corn in the ear, or 10 tons 200 pounds of stover. This was the second year of planting corn on the same land, which is by some considered a bad practice, and may be the cause of the smallness of the crop.

Two acres of corn planted on the Warren lot, was manured with five cords, per acre, of slaughter-house manure, spread and cultivated in, and 300 pounds of Coe's super-phosphate of lime in the hill; the field was planted June 4, with the variety of seed called white Flint corn, hoed as the other crops, topped September 25, and harvested October 26. It produced 200 bushels of ears, equal to at least 50 bushels of shelled corn, per acre. Two years ago this land was valueless for any crop except pasture grass, and poor at that. The Board have trenched and drained it, and last spring planted upon it 92 apple trees. If the trenching and draining is continued, the Warren lot will become the most valuable land on the farm.

BEANS.

Two acres of beans were planted on the plain, June 3, and manured with 300 pounds of plaster and 400 pounds of Coe's super-phosphate of lime, mixed and drilled in. The product of these two acres was 30 bushels of shelled beans.

Half an acre of cabbages were set in the vegetable garden, the last week of June, manured with four cords of barn manure, and produced 2,500 heads.

PARSNIPS.

A half acre of parsnips in the vegetable garden, was manured with four cords of barn manure, and are now in the ground for spring use; the product will probably be equal to 400 bushels.

Half an acre of marrow squashes, in the vegetable garden, were manured with four cords of barn manure, but, notwithstanding the unwearied care of the gardner, the crop proved a failure, yielding not more than 400 pounds.

One and a half acres of barley in front of the farm house, was manured with six cords of barn manure spread and ploughed in; the barley was sown broadcast, May 20, and harrowed in. It produced 28 bushels per acre. The straw was not weighed.

The one acre and a half of wheat, cultivated on the lot west of the institution garden, was sown the 12th of April, broadcast, with four bushels of seed, and harrowed in; the product was 38 bushels of wheat, weighing 58¼ pounds the bushel. The straw was not weighed. The land was manured from the barn cellar, at the rate of six cords the acre, spread and ploughed in.

Two and a half acres of winter rye, on the hill south of the barn, produced 52½ bushels of good grain, 21 bushels per acre. This rye was grown on land upon which 300 pounds of guano, per acre, were spread and harrowed in, and planted

with Chinese sugar cane the last year. The crop of cane failed, and the land was ploughed and seeded to rye in September, 1857, at the rate of one and a quarter bushels per acre.

Two acres of winter rye were cultivated on land which was trenched fourteen inches deep, and from which a great amount of stone has been removed by the Board, within the last three or four years. When commenced upon, this land was literally a bed of rocks, and nearly worthless for the product of any crop; under the direction of the Board, it has become valuable, and has produced, the present year, $56\frac{1}{4}$ bushels of rye, and 5,500 pounds of straw, together with 480 bushels of purple-top turnips, a much smaller yield than was expected, owing to the disobedience of orders on the part of the head farmer. The market value of this cannot be less than one hundred and seventy-five dollars.

A portion of the half acre of winter rye, south of the barn, was cut when in blossom, for the purpose of soiling four cows. The cows were fed eight days, the time which the rye was in suitable condition for fodder, and consumed the crop growing upon 13,384 square feet, nearly five-sixteenths of an acre of land, which would amount, estimating the rye at twenty dollars the acre, to $6.14, showing the money value consumed daily by each cow, to be 19 and $\frac{19}{100}$ cents, 12 and $\frac{4}{100}$ cents more than the cost of pasturage, as estimated by the committee on stock, in their experiments of 1856. The remaining part of this half acre produced seven and one-quarter bushels of rye; the straw was not weighed.

The principal products of the farm for the year have been as follows, viz.:—

Indian corn, shelled,	536	bushels.
Oats,	230	"
Wheat,	38	"
Carrots,	1,076	"
Ruta-bagas,	590	"
Parsnips,	400	"
Beans,	35	"
Upland hay,	81	tons.
Rowen,	4	"
Oat straw,	4	"
Millet,	2	"
Potatoes,	1,553	bushels.
Rye,	116	"
Barley,	42	"
Flat turnips,	1,520	"
Beets,	670	"
Onions,	711	"
Cabbages,	2,800	heads.

Meadow, ...	28 tons.
Rye straw, ...	6 "
Corn fodder, . . .	15 "
Winter apples, . . .	24 barrels.

Besides the produce of the garden in front of the institution, and other small articles which have been disposed of from day to day.

The number of swine at the commencement of the year was 79, valued in the inventory December 1, 1857, at		$732 00
Paid for swill from the institution for the year, .		350 00
Value of produce from the farm and milling, fed to swine for the year, ...		182 29
Purchased one boar, ...		25 00
Making the debt for the year, ...		$1,289 29
Value of swine sold the last year, .	$826 52	
Value of 73 swine now on hand, as per inventory, ...	440 00	
Making the account credit, . . .		1,266 52
Showing a loss for the year, of		$22 77

This state of the account is not unexpected, for, in consequence of the low state of the market, the 73 hogs now on the farm have been inventoried $292 less than the 79 on the farm at the close of last year, although of the same size and quality, and but six less in number. It is also well known, that pork has been lower in price this, than for a number of years past, and our swill from the institution has cost the same, and for the last six months so much reduced in quantity and quality, as to render it necessary to reduce our number of hogs as fast as possible, by selling shotes at low prices, and disposing of old hogs before they were fully fattened.

The number of neat cattle on the farm at the close of last year, was 37, inventoried at . . .	$2,630 00
Eleven head of cattle have been purchased within the year, at a cost of	840 00
Making the value of the cattle inventoried at the commencement and purchased within the year, .	$3,470 00

The number of head of neat cattle now on the farm is 41, inventoried at	$3,040 00
Nine have been sold within the year, for . .	427 00
(One cow lost by death and three bred,)	
	$3,467 00

Making the value of the stock now on the farm, and that sold and bred within the year, $3,467, or within three dollars of the value of that on the farm at the commencement and purchased within the year.

The blood cattle on the farm now number fifteen. Five Herefords, four Devons, three Durhams, two Jerseys and one Ayrshire. Four are males and eleven are females; seven were purchased at a cost of $735, seven have been bred on the farm, and are now worth more than the cost of the seven purchased. One, a Jersey cow, was a valuable gift to the Board from the Massachusetts Society for the Promotion of Agriculture. These cattle are of the very best blood, and the committee have inventoried them at $1,440. They can doubtless be sold for this sum, and probably more.

There are five horses on the farm. Two were there previous to 1854, one was purchased in 1855, one in 1856, and one in 1857. Last year the five were inventoried at $680; this year their value in the inventory has been reduced to $500.

About a year ago one of the horses, in consequence of a bad cold, had a violent inflammation in his forward feet, accompanied by high fever, which caused a casting off of the hoof; he was turned to pasture the last summer. New hoofs are now grown, so as to permit his being shod and performing his usual labors on the farm. Four of the horses are old and are beginning to fail, and in a few years must be replaced by others.

The two acres of land on the plain, where millet was raised and cut for hay, were manured with four cords to the acre, of reservoir manure, ploughed in, and on the 3d day of September, were seeded with three bushels of winter rye.

Six acres on the Sibley lot, where Indian corn was raised, were ploughed and seeded on the 2d and 3d days of October, with seven bushels of winter rye, manured with fifty pounds of guano the acre, which was harrowed in with the rye.

There is also on the Sibley lot, six and one-half acres of land, where potatoes were cultivated the present year, which were ploughed on the 7th and 8th, and seeded with nine bushels of winter rye on the 9th of October, without manure of any kind.

One-half acre of land near the steam mill, was manured with one hundred pounds of guano, and seeded with one bushel of winter rye, on the 3d of September; the rye was harrowed

in with the guano. In all fifteen acres, the sowing of which, with the seed, cost the Board $75, and the committee have valued it at that sum in the inventory.

The amount charged to improvement during the year, is $1,664.47. Of this sum, $336.60 worth of the labor has been done by boys and men from the institution, free of expense to the Board, reducing the amount charged for improvements to $1,327.87.

JOHN BROOKS.
JOSIAH WHITE.
JABEZ FISHER.
SIMON BROWN.
THOMAS J. FIELD.
OLIVER C. FELTON.
EDWARD W. GARDNER.
JOHN C. BARTLETT.

The preceding pages will give a correct general idea of the operations of the Board upon the State Farm, at Westborough.

It will be perceived that much of the time and labor spent there have been devoted to the development of the capacities of the farm, and that there has been a progressive increase in the productions upon it. Some of the lots which are now among the most productive and valuable, were perfectly useless for any purposes of profitable cultivation, five years ago. The lot directly in front of the farm house, the Warren lot, and some acres lying west of the garden in front of the institution, may be mentioned as examples of this. These lots were so imbedded in fast rocks as to be nearly worthless and incapable of tillage. Thousands of tons of such rocks have been removed, either by blasting or sinking beneath the surface, so as now to be out of the reach of the plough ; and the land, now comprising several acres, is some of the best, and will soon be the most productive on the farm. To facilitate the clearing of these lots, a machine was constructed, by means of which rocks of from four to six tons could be easily lifted from their original bed and removed to any desirable point where they would be most out of the way. This machine is represented in Fig. I. It is simply constructed and may be furnished with a purchase so powerful that two boys can lift a rock of six tons weight, which, with suitable wheels, one yoke of oxen can remove far more easily than a much larger team attached to the common drag loaded with the same weight.

It is not, therefore, too much to say that the farm is now in a condition to produce far more largely with suitable care in future, than it has ever done. The real benefits to be derived

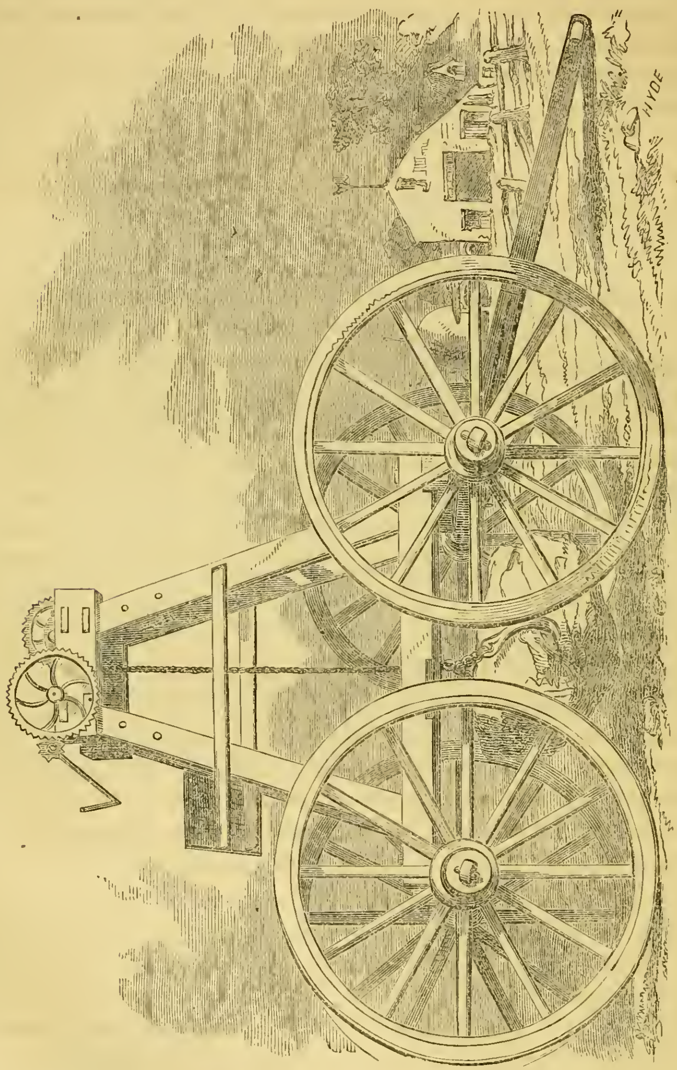

Fig. I.—Stone Elevator.

from trenching and draining are not fully attained till after the first two or three years or more after these operations. They are rather prospective and permanent, than immediate in their character.

At the meeting held in Westborough, on the 19th of October, it was resolved that it is inexpedient for the Board of Agriculture to take any steps to renew the contract for the further possession and management of the State Farm, at Westborough, and thereupon a committee was appointed, consisting of Messrs. Bartlett, Fisher, Grennell, Bull, and the Secretary, to consider and report some plan of action for the future operations of the Board. That committee having considered the subject, previous to the next meeting held in Boston on the 18th of January, submitted the following

REPORT:

It having been determined, at the October meeting of the Board of Agriculture, that it was inexpedient for said Board, under all the circumstances, to renew the contract with the Trustees of the State Reform School, at Westborough, by which the management of the farm connected with the school was placed in our hands, the question presented itself with much force, "What course the Board ought to adopt in reference to its future action?" and the undersigned were chosen a committee to consider this subject, and report a plan which should give every member of the Board, if possible, some part in its labors. The true position of the Board of Agriculture, in its connections with the farmers of the State, is somewhat different from that of any other agricultural association established by our laws, and as its members are, in the main, chosen by the other societies, it is to be presumed that those persons selected as its members, are of a class calculated to exert an influence, more or less extended, throughout the limits of the various county societies. The Board is thus brought into direct contact with every portion of the State, and would seem to possess peculiar facilities for conducting the investigations which are needed in all departments of agriculture, which, as a *science*, is as yet, very far from perfection.

Hitherto the chief labor required by any course of investigation, has been thrown upon the Secretary, and neither the Board nor the people of the State can complain that his labors have not been well performed. But, in the vast range of subjects open for inquiry, the Secretary, however efficient, must of necessity leave many points untouched, and it would seem, therefore, that a much greater amount of labor can be performed if every member of the Board is diligently working upon the investigation of some agricultural topic. Besides, it seems by no means proper, that the Secretary of a body as numerous as the Board of Agriculture, should be the only working agent,

the Board itself exercising only an indefinite and nominal supervision of his labors. Having given the whole subject, as we believe, a careful consideration, we would unanimously recommend that the Board be subdivided into committees of such a number as can conveniently work in an efficient manner, each committee having assigned for its consideration a particular subject which it may be thought best to investigate. These committees should be instructed to enter into communication with the farmers of this and other States, and from the *facts* thus procured, make an annual report to the whole Board in January. Believing that but slight dependence can be placed upon circulars addressed to the farmers by mail, which are too often laid aside and forgotten, we would recommend that any circulars designed to procure answers for information, be sent to the members of the Board in the respective societies, and that they personally attend to the procuring the answers to the same from a sufficient number of persons to meet the requisitions of the circular, and return the same to such members of the Board as may have the subject of the circular in charge. We would also recommend, that each member urge upon farmers the necessity of forming, in each town, an efficient farmers' club, which shall eventually become the channel of communication with this Board.

A proper blank should be transmitted to them, and as the best form of such a blank may be an important consideration, we also recommend the appointment of a committee to prepare and report to the Board, at this time, a document for this purpose.

We recommend, finally, that a book shall be kept in the office of the Board, in which shall be entered such subjects as may be suggested, from time to time, for examination, and that all persons be invited to add to the list any topic which they may think worthy of investigation.

Believing that some course similar to that which we have recommended, must eventually be adopted, if the Board would maintain a lengthy existence, we submit these suggestions to your consideration, not supposing them perfect, but as a basis upon which your wisdom and future experience may build a superstructure which shall cause the Massachusetts Board of Agriculture to be respected for its usefulness, through many generations yet to come.

JOHN C. BARTLETT.
E. W. BULL.
JABEZ FISHER.
PAOLI LATHROP.
JAMES S. GRENNELL.
CHARLES L. FLINT.

This report was adopted, and the following subjects were accepted as among the most practically important for investigation at the present time, especially as the object of appointing the committees of investigation was not to get a series of commonplace essays upon the various subjects, but to canvass every town in the State, ascertain the names of those who are willing to try experiments in the most exact, uniform and careful manner, and aid in *originating* information, and thus gain something new.

1. Manures.—The committee on this subject was constituted by the appointment of Messrs. Jabez Fisher, Josiah White and John Brooks.

2. Renovation of Pasture Lands.—Messrs. Oliver C. Felton, William G. Lewis and Paoli Lathrop.

3. Market Fairs.—Messrs. Richard S. Fay, William Sutton and Charles G. Davis.

4. Root Crops.—Messrs. Simon Brown, Edward W. Gardner and George M. Atwater.

5. Fruits and Fruit Culture.—Messrs. Marshall P. Wilder, Ephraim W. Bull and Nathan Durfee.

6. Farm Fencing.—Messrs. Charles C. Sewall, Charles G. Davis and John C. Bartlett.

7. Cattle Husbandry.—Messrs. Paoli Lathrop, Charles K. Tracy and John Brooks.

8. Sheep Husbandry.—Messrs. James S. Grennell, Samuel H. Bushnell, Cyrus Knox and Richard S. Fay.

9. Diseases of Vegetation.—Messrs. John C. Bartlett, William G. Lewis and William S. Clark.

10. Improvement of Horses.—Messrs. George M. Atwater, George Marston and William S. Clark.

11. Grain Crops.—Messrs. Ephraim W. Bull, Charles C. Sewall and Levi Stockbridge.

At the same meeting, Dr. Bartlett from the committee appointed to investigate the remedies proposed by various applicants for the reward offered by the State for a discovery and cure for the potato disease, presented the following

REPORT:

The legislature having referred the award of the premium offered by the State for the cure of the potato rot to the Board of Agriculture, the undersigned have, under the direction of the Board, given the

subject a fair examination. We regret, however, that the gross and culpable carelessness of those who have had charge of the papers and applications transmitted to the Office of the Secretary of State, should have suffered the larger portion of them to be irrecoverably lost, previous to the passage of the Act referring them to the Board of Agriculture. We have no means by which to determine with accuracy, at what stage of their progress to our hands this loss occurred, but the blame is by no means lessened by the fact that the intrinsic value of these papers was, in the aggregate, of but small amount. They were public documents, awaiting their final disposition under a special Act of the legislature, and their destruction is a deep reproach to those who are the legal guardians of such documents.

In the year 1852, there were in the State department, according to a synopsis published by Hon. Amasa Walker, then Secretary of State, fifty-two communications by as many different individuals resident in Massachusetts, besides many others from persons residing in other States, which did not accord with the requisitions of the law, and therefore have not been examined by us. Of these fifty-two communications about twenty are now in existence, and the most careful research by advertising and otherwise, has failed to discover any portion of the remainder.

Of those in our possession, some do not propose any distinct remedy for the diseases of the potato, and of course could not be made the subject of any experimental tests. Twelve of them, however, give distinct formula of preparations, and the manner of preparing the soil; and we obtained leave from the superintending committee of the State Farm, at Westborough, to select a proper portion of the farm for applying the remedies recommended. The piece of land selected was in the Warren lot, which had been trenched, and was so situated that each lot (containing one-eighth of an acre) sloped gradually from dry to moist land.

These experiments were conducted under the direction of the undersigned, with quite as much and probably more care than the various processes would be likely to receive at the hands of any farmer managing a large farm, and in one point or another, all failed to give such results as would entitle them in any way to the confidence of the community, or as answering the requisitions of the law. Under these circumstances, we do not hesitate to report decidedly, that no one of the applicants is entitled to the premium offered by the State.

John C. Bartlett.
Jabez Fisher.
Nathan Durfee.

This report was accepted, and it was voted that the secretary be authorized to transmit the report of the committee to the legislature.

Dr. Bartlett afterwards submitted to the Board the following as a supplementary

REPORT:

The committee to whom was referred the investigation of the diseases which have for many years been so destructive to the potato crop throughout the world, beg leave to offer a partial report of the results to which they have been able to arrive. The importance of the subject to the general interests of the inhabitants of the civilized portion of the world, and its very close connection with the pecuniary interests of the farmer, have been duly felt by us, and we have labored perseveringly, though quietly, to carry on our investigations in the manner which our own judgments taught us was likely to be the only one through which the truth could be reached, and we regret to say that we have received, from the ignorance of those whose interests are most deeply involved in our success, more sneers at what they regarded as our folly, than encouragement and aid in our work. We had hoped that an examination of the papers in the State department, communicated by the various claimants of the bounty of the State, would furnish us with such records of facts as would enable us to form some well digested plan of action in our investigation. But we were doomed in this expectation to be grievously disappointed, and we are constrained to say that we do not believe a more degrading record of ignorance of the first principles of natural science can be found than those papers, as a whole, manifest, although we should cheerfully except from this condemnation a few which seem to have been written with something of the modesty which always characterizes the cultivated writer.

Failing to find the information which we needed in these sources from which we had a right to expect it, we prepared and distributed in large numbers, circulars asking the aid of the farmers throughout the United States, in the collection of facts upon the subject committed to our hands, and here again we have not only failure and disappointment, since out of the very large number distributed in all directions, we have received returns from less than thirty, and those are mainly from the applicants for the premium offered by the State. We cannot but regard this want of interest on the part of the agricultural portion of society as somewhat disgraceful, and as indicative of

the necessity of greatly increased exertion on the part of the friends of agricultural education.

Thrown upon our own resources, we have studied the symptoms of disease in the fields during every period of the growth of the potato, and have noted the indications of derangement in the organic action of the plants as they have occurred, and these we propose to speak of in the first place.

Early in June most potato fields exhibited, to a greater or less extent, a blackened appearance of a portion of the leaves, commencing generally at the tip of the leaf, but sometimes upon its side, and gradually extending until often the whole organ in a short time was entirely deprived of vitality. Such leaves subjected to the microscope manifested no indications of the depredations of insects, but appeared to have been cast off by a natural effort, as though having performed their functions they had simply died because their sources of nourishment were cut off. This appearance of the leaf gradually increased until so many were involved that they could be seen at a long distance from the field. It does not however appear to have been a precursor (of any value) of the future local disease of the tuber, since many fields which were most affected by it presented very little indication of disease upon harvesting the crop.

About the last of June, Chenango potatoes planted without forcing, displayed their blossom buds freely. On the first day of July it was found that a very slight jar of the stem caused them to fall to the ground, leaving only the bare flower stalk.

This condition of the bud proved a tolerably good indication of the future development of the tuber, since in all cases which were examined, where this blight of the buds occurred, either the tubers were very little developed in size or quantity, or they manifested a great propensity to take on the form of disease to be hereafter described.

Those fields which had a healthy inflorescence, and matured their seed, with a single exception, gave a good return of healthy tubers. The above affections, both of leaf and bud, although appearing first in the Chenango potato, afterwards became common to many, if not most others. On the eighteenth day of August, after an extremely sultry period of weather, during which the tops of the potatoes looked as vigorous and healthy as at any previous period in the season, there occurred a severe thunder shower, followed by a clearer and cooler condition of the atmosphere. This change was immediately followed by a very marked change in the appearance of the leaves and stalks of the potato vine, the leaf dying more or less over the field, and becoming somewhat shrivelled as though frost bitten, but less black

than in the affection first described. The progress of this attack was rapid in many instances, but slow in others, whole fields in some localities looking brown and withered, while spots of similar brown color were exhibited by the stalk. About the middle of August diseased tubers began to be found among the earlier varieties of the potato, and on the 29th of that month the first thorough examination of the actual disease was made. In this instance the variety was the Chenango, planted for early marketing. The soil was a light gravelly loam and was heavily manured the previous year with barn cellar manure spread and ploughed in.

The crop at that time was corn and the yield heavy. The past season the same kind of manure was applied for the potatoes, in the hill. The growth of vines was very vigorous and rank, but although the inflorescence was good no capsules were formed in the field.

Not far from the first of August the proprietor commenced digging for market, when the tubers were found abundant and of large size. The leaves at that time presented to some extent the blackened appearance first described in this report. As the price of potatoes fell rapidly, the digging was suspended, and in the mean time the decay of the leaf continued to progress, and a week previous to the visit of the committee, indications of disease were found upon the tubers. At the time of the visit, from six hills dug and yielding a large number of tubers, only three were found to be healthy. The following is a description of the disease of the tuber, which we have had many opportunities of examining. As we have been favored with ample opportunities for microscopic inspection, your committee would here express in a public manner their great obligations to that able and thorough microscopist, Dr. Silas Durkee, of Boston, for his very efficient aid in this department, and we regret very much that the policy of retrenchment was carried quite so far by the last legislature, that by its refusal to grant the small pittance asked for by your committee, under the sanction of the board of agriculture, we have been unable to remunerate him for his valuable services, otherwise than by recommending that the thanks of the board be given him by a special vote.

The first indication which the tuber presents to the eye of the access of disease, is a brownish discoloration of the skin, limited sometimes to small points, in other cases presenting itself in irregular patches. A more careful examination shows the skin to be nearly or quite detached from its connections, its removal showing a small quantity of colorless fluid. If this fluid is removed and the diseased spot thoroughly dried, the progress of the disease in that portion of

the potato is arrested. Placed under the microscope, the cuticle or skin is found considerably more opaque than when in a healthy condition, but is entire and presents no indication of insects or of their devastations. The external surface of the tuber is discolored, and presents no appearance of either insect or fungus. As the disease progresses the substance of the potato presents the same brown tinge, first manifested by the cuticle. A very gentle pressure by the finger separates this portion of the tuber from the more healthy part below, and if examined microscopically, it presents the appearance of fungi shooting through it, while the beautiful egg shaped particles of starch present themselves entirely unaffected by the diseased action, which has broken down the cellular walls in which they were originally inclosed. The softened matter thus removed from the tuber has, naked to the eye, a marked granular appearance, similar to the discharge from a suppurating tubercle of the human lungs.

The third and last stage of this disease converts this granular substance into a thick, ropy, cream-colored fluid, very adhesive, and of a faint, sickish odor, when brought close to the nostrils. This substance being partially soluble in water, may be readily washed off, leaving the portion of the potato, as yet undiseased, which presents a very uneven surface, sometimes cavernous, like the inner surface of an abscess in the animal tissues, at other times irregular like the granulations of a healing ulcer. Every portion of the matter alluded to is filled with grains of starch, which, through every stage of the disease are unchanged in character. And also in every period except the first, various fungi are to be seen beautifully ramified through the diseased portion of the tuber, but although subjected to a Spencer microscope, magnifying from three to seven hundred diameters, not the slightest indications of insect life or ravages were visible.

The extremely offensive odor of the decayed potatoes arises only from the putrefaction of the ropy matter above alluded to, in which state it becomes almost black. This condition, however, is not a part, but the consequence of disease occurring only after vitality has ceased.

We now come to speak of the causes of the disease just described, which is that commonly known as the "soft rot," in distinction from another disease yet to be investigated, and usually designated as the "dry rot."

Every reflecting person must see at once that disease is an unnatural condition of every organic being, and can only exist in consequence of a disturbance or change of the vital actions.

The causes which produce this change of the natural actions, may therefore be very gradual in their progress, tending less to induce of

themselves active disease, than to produce such a state of the system as shall lessen the vital power to resist other causes. Such influences, as they do not produce of themselves specific disease, physicians have properly called remote or predisposing causes, and it is mainly upon their removal that we must depend to diminish the tendency in organic matters to take on disease.

Other causes, which act either directly or indirectly to produce immediate disease in the previously debilitated tissues of a living body, have received the name of exciting or proximate causes, and may be as various as the circumstances surrounding the various individual organic bodies which take on diseased action. It is of the latter class of causes only that we propose to speak in this report, reserving the consideration of the predisposing cause or causes for another report, after we have had farther opportunity to trace them. We have been able to trace clearly three distinct causes, which produced immediate disease in the potato, viz.: the atmospheric change before alluded to, after a severe thunder storm, when the leaves and stalks of many fields in a few hours presented a diseased and almost dying appearance, but whether from electrical change, or the sudden abstraction of the caloric from the atmosphere, or from the water applied through means of the shower, we cannot determine. And here let us remark that we have no intention of covering our ignorance under that convenient scientific cloak, to which many men resort when saying that disease is propagated by the atmosphere, which is only a learned method of saying we know nothing about the subject.

Another cause which was followed in a few hours by a virulent attack of the local disease of the tuber, was mechanical injury of two kinds, viz.: contusion, as when the tuber was violently struck against a stone, or was brought strongly into contact with another tuber. Having from some circumstances suspected this to be the case, we made some careful experiments, which very clearly revealed the fact that a moderately severe blow by any hard substance, sufficient to leave upon the surface of the tuber the slightest mark, was, during the period while the disease was epidemic, in most instances followed by the local disease commencing at the bruised spot as a centre. Cutting with the hoe in digging, was in certain varieties almost invariably followed by the access of disease, commencing upon both the divided surfaces, and proceeding rapidly to involve the whole tuber.

The cause, however, which produced the most malignant type of disease was exposure to the sun for a few hours during the intensely

hot days which occurred in the month of last August. Not many hours were required to change the exposed surface to such a degree that the expanded fluids burst through the cuticle and stood in black, inspissated masses upon the tuber. In such instances, we have seen the potatoes entirely destroyed in less than thirty-six hours. It may be suggested by some persons that the fungi which exhibited themselves in the diseased matter of the potato might have been after all the exciting cause of diseased action, but we think the fact that the first stage of the disease, upon a most careful examination, manifested not the slighest trace of any fungus, is amply sufficient to warrant the conclusion that the sporules which by some yet hidden law exist in every conceivable position, vegetate whenever the decaying matter of the nidus in which they are deposited, affords the requisite nutriment for the fungus.

After a very careful consideration of all the facts which we have observed, and in connection with the perfect uniformity exhibited by the disease to which we have called attention, we are constrained to regard it as an epidemic disease having a strong analogy to the inflammation of animal tissues, but differing of course from animal inflammation, because of the difference in the kind and number of tissues and artal actions involved, yet bearing a marked resemblance in its access and subsequent progress to ulceration. In concluding our report, we wish to make one suggestion to our brother farmers, the reasons for which we may give after we have had more extended opportunities for experiment. Let every farmer at the proper season of the year carefully save a quantity of the capsules or balls of the potato, and plant the seeds in suitable soil. It is probable the first year will exhibit marks of disease in some of the varieties obtained. Throw such aside, and plant only such as manifest vigorous growth and in every way a healthy appearance. Pursue this plan year after year, rejecting every variety which easily takes on disease, and planting seeds each year to supply the want for good potatoes, and carefully note year by year the results, which we think, in any view of the matter, will be found to be valuable. Asking leave of the Board to continue our investigations, and proposing, if opportunities should occur, to make an examination of the other disease which has sometimes ravaged our potato fields under the common name of "dry rot," we submit the foregoing, with the hope that what is therein contained may, if of but little value in itself, be an aid in any farther investigations that shall be carried on in the future.

John C. Bartlett.
Jabez Fisher.
Nathan Durfee.

The above report was accepted, and it was voted that the thanks of the State Board of Agriculture be presented to Dr. Silas Durkee, of Boston, for his valuable aid in microscopic examinations of the potato disease, and that the Secretary be requested to transmit to him a copy of this vote.

It having been voted, at a meeting held in Westborough, on the 7th of July, to appoint a committee, consisting of Messrs. Atwater, Marston and Brown, to take into consideration the subject of collecting and publishing information on agricultural subjects, for distribution in pamphlet form, that committee, at the meeting held on the 21st of January, 1859, submitted the following

REPORT:

The committee to whom was referred the consideration of the subject of publishing information on agricultural topics, in tract form, respectfully report:—

That it is of great importance that reliable facts and theories, which have been tried and proved, should be communicated to the farmers of the Commonwealth. This department is already rich in such matters for publication, which might be condensed, and in a concise form, be published for general diffusion among the people. There is an abundance of agricultural publications, but they are either so diffuse or so contradictory as to mislead or confuse those who are seeking for knowledge. Very many agricultural writers have theories of their own to sustain, and the farmer is often led into the error of taking for an established system, what is in fact only a favorite theory of some interested agricultural writer. From some impartial source our agricultural population should receive, in a popular form, what they can depend upon as either positive truth, or the most complete information that is possible. Brief essays, upon important topics, upon which there are no contested questions open, will be of great value; such as agricultural chemistry, improving exhausted land, the choice of stock for dairy or other purposes, the culture of root crops or other specific crops, the choice of soils adapted to various crops, the selection and planting of fruit trees, and others of like character. These might be published in tracts of fifteen to twenty pages for one cent, and might be very widely diffused. We have no doubt an appropriation sufficient for this purpose can be obtained of the present legislature without difficulty.

The action of the Board, looking to the reference of specific topics to committees, for future report, has reference to a time considerably remote. The publications which we propose may be entered upon at once, and in season to have its effect upon the farming operations of the present year. And we recommend that a committee be appointed to superintend the publication of such tracts as may be approved by them, under the direction of the Board.

GEO. M. ATWATER.
GEO. MARSTON.

This report was accepted, and it was voted to appoint a committee to carry out the objects proposed. This committee was constituted by the appointment of Messrs. Atwater, Marston and the Secretary.

At the same meeting, January 21st, a committee was appointed consisting of Messrs. Davis, Brooks and Sutton, to consider and recommend some uniformity of action on the part of the societies in awarding premiums. That committee having attended to the duty assigned it, at the next meeting, held February 2, submitted the following

REPORT:

The committee appointed to inquire into the propriety and means of producing greater uniformity in the action of the several agricultural societies of the State, respectfully report that it is desirable that there should exist uniformity in the action of the societies in the following particulars.

1. Uniformity in the mode of weighing or measuring the crops offered for premiums.

2. In offering premiums only for such animals as are owned or kept in the county or territory in which the society is located.

3. Regulations with regard to the days of exhibition, and a return of the day of exhibition to the secretary of the Board on or before the first of January in each year.

These rules your committee think are desirable for various reasons. All the comparative estimates from the product of the various sections of the State depend upon the uniform and reliable measurement by the county societies, of the amount of produce, and until these are effected no valuable deductions can be drawn. The basis is rotten and shifting, and the whole superstructure falls to the ground.

The controlling argument in favor of the establishment of new societies in a county, rests upon the consideration that certain sec-

tions of a county are not accommodated by the existing society. If such be the case, there seems to be no good reason why the same sections should be afterwards allowed to compete for premiums in both or all of the societies in the county, after the new organization is affected. The great object of the societies is to encourage competition among farmers, but if a person having an accidental product of the first quality be allowed to sweep the premiums in more than one county society of equal grade in the State, it tends to discourage farmers throughout the county.

Some regulations with regard to the time of holding fairs are absolutely necessary, and the collision which now exists could be easily avoided if societies would hold their fairs on Tuesdays, Wednesdays, Thursdays, and Fridays in each week, instead of Wednesdays and Thursdays, as is generally the case, by which means four societies at least, in each section of the State, could hold their fairs in the same week.

But your committee, from an investigation of the power and duties of this Board, are met with the objection that it has only power to make to the legislature in its annual reports, such recommendations and suggestions as the interests of agriculture may require. These are all the powers which this Board has in the premises. They may prescribe forms and regulate returns of the societies, and may investigate subjects relating to agriculture, but have no power to regulate the action of the societies, but only to make suggestions and recommendations through their report to the legislature.

If the suggestions of this report meet the views of the Board, the committee would respectfully suggest that the same be communicated to the legislature as their suggestion, and recommend that such action may be taken upon the rules herein suggested as may be deemed advisable by the legislature.

CHARLES G. DAVIS, *Chairman.*

This report was discussed at great length, when it was

Voted, To refer that part of the report which relates to the measurement of grain crops, &c., to the committee, consisting of Messrs. Brooks, Davis and Grennell, to lay it before the Committee on Agriculture of the legislature.

The following resolve was also passed, after mature deliberation, as an expression of opinion as to what the law ought to be, to correct some of the evils which have grown up as an incident to the multiplicity of societies in some sections :—

Resolved, That no animal or article for which a premium shall be awarded to the owner by any incorporated agricultural society receiving the bounty of the State, shall at any time thereafter be considered a subject for any further premium of such society, except it be for qualities different from those for which the former premium was awarded; provided, however, that nothing in this act shall affect, restrain, or limit a competitor for premiums offered by the State Board of Agriculture, or the Massachusetts Society for Promoting Agriculture.

The subject of holding market fairs was introduced by the committee appointed to investigate and collect statistics in relation to it, and it was

Voted, That this Board recognizes the great importance of establishing frequent markets or fairs for the sale of agricultural products.

Voted, That the subject be brought before the county agricultural societies, with a request that they will take early steps for the establishment of markets within their respective districts.

Voted, That the Secretary communicate the above to the several agricultural societies.

At the meeting of the Board, held on the 18th and 21st of January, it was

Voted, To appoint a committee to consider and report upon the propriety of instituting meetings similar to Teachers' Institutes, for the discussion of agricultural topics.

This committee was constituted by the appointment of Messrs. Bull, Brown, and Bartlett, and at the meeting held on the 2d of February, they submitted the following

REPORT:

Nothing is so difficult as the true adjustment of theory and practice in agriculture. The modifying influences of soil, climate, exposition, require on the part of the farmer a larger experience, and in the proper application of the soundest theory a larger intellectual force than falls to the lot of most men. The longest life is often inadequate, on the part of an individual, to accomplish results which, by aid of and communication with his fellows, might be made possible.

The theory of manures, for instance—the successful application of which lies at the base of all good farming—is probably understood by

very few farmers in the State, and the proper mode of preparing and applying them to different soils and to different crops has so many phases that it is hardly too much to say that one man cannot understand it in all its length and breadth. But if you bring together the farmers of a town or district and discuss the matter fully, their various experiences throw a flood of light upon the whole subject, and difficulties are mastered by the aid of many minds, which would be insurmountable to one.

Again, the theory of rotation of crops, giving rest to the ground and enabling it to put forth its full powers, increasing crops while it saves the soil from exhaustion, requires many experiments, and can only be proved to be correct—and consequently adopted—by the aid of many minds.

The writings of a Pickering, a Lowell, a Buel, a Downing, and the essays of able cotemporaries, do not, after all, reach many minds, and really influence but a few thinking men who adopt their suggestions, and apply them in their practice. But if you bring men together, their effects are multiplied. Thought kindles thought, and one successful experiment, leads to frequent imitation, so that, if the experiment has been successful, not because of some accidental or concealed cause, but because it was founded on a sound theory, it becomes the rule of action, and improves the condition of whole masses of men.

The farmer feeds the nation, and without him society is impossible. What a dignity does this give to his profession. But most farmers look upon their labor as drudgery, and their sons escape from it into the crowded avenues of the professions, or commerce, or trade; yet no calling is so conducive to mental and physical health. In no pursuit can he find so complete a development, so true a manhood.

"Nature is a bride to him who wins her,"

and in penetrating her secret arcana, he compels her choicest favors.

Assemble the farmers then, and impress upon them these great truths. Show them your experiences and your successes; inoculate them with the desire of progress; bring them face to face with the science of agriculture; help them to explore its mysteries, to adapt its formulas to their daily necessities; induce them to take an active part in these discussions and investigations, and you will inaugurate a real progress.

In this mode theory and practice will find their true relation.

Public meetings, under the direction and control of the Board of Agriculture, will best subserve this purpose.

Your committee therefore recommend that the Board of Agriculture authorize a committee for each county in the State, the members resident in the county, whose duty it shall be to call a meeting of the farmers at such time and place as in their best judgment may be proper, to promote the interests of the farmer by discussions, lectures, essays, or otherwise, and who shall communicate to the Board a full report of their doings.

Your committee would also recommend that these meetings be commenced as soon as possible.

E. W. Bull.
Simon Brown.
John C. Bartlett.

The above report was unanimously adopted, and the members of the Board in the various sections of the State were constituted committees accordingly.

Mr. Lewis presented his final report as Treasurer of the State Fair held in Boston, which was accepted, and a committee was appointed, consisting of Messrs. Wilder, Bull, and Sutton, to audit his accounts.

During the past year the Board has met with a severe loss in the death of the late Hon. Moses Newell, delegate from the Essex society. At the meeting held at Westborough, on the 7th of April, the first after this event took place, Colonel Wilder called attention to it in appropriate terms, and offered the following:—

Resolved, That we learn with the deepest sorrow, the death of the Hon. Moses Newell, of Essex county, in the full maturity of his powers, and at a time when his services were so highly regarded and so generally recognized.

Resolved, That we fully appreciate the obligations which rest upon us and upon the community to cherish his memory for the interest which he always manifested in the cause of agriculture in this Commonwealth, and for the uniform kindness, courtesy and benevolence of heart which endeared him to all who knew him.

Resolved, That we sympathize most deeply with the family and relatives of the deceased in their severe affliction, and that the Secretary be, and he is hereby requested to furnish to them a copy of these resolutions, and to enter them upon the records of the Board.

Messrs. Fay, Brooks, and others also paid a high and deserved tribute to the memory of the deceased, when the resolutions were unanimously adopted.

At the same meeting, it was

Voted, That a first premium of ten dollars be awarded to Mr. J. B. Hull, of Stockbridge, for the best acre of carrots entered at the State Fair held in Boston.

Voted, To award a diploma to Mr. Benjamin Hull, of Lee, for his crop of turnips entered at the State Fair.

Voted, That it is expedient to hold the second State Fair in the city of Springfield, in 1860, provided a satisfactory guarantee fund is secured.

Voted, That the county agricultural societies be requested to express an opinion as to how frequently State Fairs should be held thereafter.

Voted, That this Board do most heartily approve of the objects of a bill presented in the House of Representatives in congress, December 14, 1857, by the Hon. Justin S. Morrill, of Vermont, requesting congress to donate public lands to each State and Territory which may provide colleges for the benefit of agriculture and the mechanic arts, and that our senators and representatives in congress be requested to render their best aid in securing the passa aid bill into a law; and that the Secretary be requested to nish each of our senators and representatives with a copy of the above.

At the meeting held on the 7th of July, delegates were appointed to attend the exhibitions of the county agricultural societies, and their reports, presented at the annual meeting in January, will found on a subsequent page.

In accordance with my usual custom, to develop some special subject in each of my annual reports, I have devoted much time to the collection of statistical and other information in reference to the Indian corn crop, the most important, all things considered, that is known to American agriculture. According to the United States census, the number of bushels of Indian corn raised in the country in 1850 was no less than 592,071,000, or nearly six hundred millions. The land occupied by this crop was 31,000,000 of acres, and the value was estimated at $296,035,552. This formed about three-sixteenths of the total agricultural product.

From the same source it appears that in that year there were 20,000,000 of acres devoted to meadow and pasturage, while the hay crop covered 13,000,000 of acres, and was valued at $96,000,000. The same year 11,000,000 of acres were devoted to wheat, which was valued at $100,000,000, and 7,500,000 acres to oats. The number of acres devoted to cotton was but 5,000,000, and the aggregate value was but $98,000,000.

The above product of Indian corn was distributed over the various sections of the country, so as to give the comparative yield to each person and the proportion of improved land devoted to this crop, as follows:—

1850.	Bushels to each person.	Proportion of improved land devoted to corn.
Whole United States,	25.53	.333
North-Western States,	44.02	.029
South-Western States,	39.15	.025
Southern States,	28.22	.056
Middle States,	9.12	.308
New England States,	3.73	.702
California and Territories,	2.20	.002
Planting States,	36.12	.028
Other States,	18.06	.081

The details of this important crop will appear more clearly in the following table, showing the number of bushels produced in each section, and the number of bushels per acre in each in the year 1850. It will be seen that the average yield per acre, for the whole United States, is about twenty-five bushels, and that of the New England States thirty-one bushels, while the aggregate amount raised in New England was 10,174,000 bushels.

STATES AND TERRITORIES.	Bushels of Corn produced.	Average per Acre.	Ratio of Population.	Ratio of Corn produced.
Ohio,	59,078,000	36	8.54	9.97
Kentucky,	58,672,000	24	4.24	9.91
Illinois,	57,616,000	33	3.07	9.73
Indiana,	52,964,000	33	4.26	8.95
Tennessee,	52,276,000	21	4.32	8.83
Missouri,	36,214,000	34	2.94	6.12
Virginia,	35,254,000	18	6.13	5.95
Georgia,	30,080,000	16	3.48	5.08
Alabama,	28,754,000	15	3.33	4.86
North Carolina,	27,941,000	17	3.75	4.72
Mississippi,	22,446,000	18	2.92	3.79
Pennsylvania,	19,835,000	20	9.97	3.35
New York,	17,858,000	27	13.36	3.02
South Carolina,	16,271,000	11	2.88	2.75
Maryland,	10,749,000	23	2 90	1.82
Louisiana,	10,266,000	16	2.23	1.73
Arkansas,	8,893,000	22	.91	1·50
New Jersey,	8,759,000	33	2.11	1.48
Iowa,	8,656,000	32	.83	1.46
Texas,	6,028,000	20	.92	1.02
Michigan,	5,641,000	32	1.71	.95
Delaware,	3,145,000	20	.39	.53
Massachusetts,	2,345,000	31	4.29	.40
Vermont,	2,032,000	32	1.35	.34
Florida,	1,996,000	–	.38	.34
Wisconsin,	1,988,000	30	1.32	·34
Connecticut,	1,935,000	40	1.60	·33
Maine,	1,750,000	27	2.51	.30
New Hampshire,	1,573,000	30	1.37	.27
Rhode Island,	539,000	–	.64	.09
New Mexico,	365,000	–	.27	.06
District of Columbia,	65,000	–	–	–
Minnesota,	16,000	–	–	–
California,	12,000	–	–	–
Utah,	9,000	–	–	–
Oregon,	3,000	–	–	–

There are no means of ascertaining with positive accuracy the yield of this crop in 1858, but from the most reliable sources at command, it is safe to say there were no less than 670,000,000 of bushels, and this at an average value of fifty cents per bushel would be worth $335,000,000; and if we add to this the value of the fodder it yielded in addition, the value of the cobs and the cords of manure produced from this crop alone, the aggregate value to the United States for 1858, cannot be set down as less than $700,000,000.

To show how rapidly the culture of this plant has extended, it may be stated that France produced 17,280,000 bushels in 1826, and in 1847, about 33,400,000, an increase of nearly one hundred per cent. in twenty years. Russia produced 16,000,000 bushels in 1850.

The yield of Indian corn in the different counties of Massachusetts may be stated as follows:—

COUNTIES.	No. of Bushels, 1850.	No. of Bushels, 1855.	No. of Acres, 1855.
Worcester County, . . .	476,107	485,565	16,185½
Hampshire County, . . .	272,370	291,189	10,041
Middlesex County, . . .	269,908	331,934	11,446
Hampden County, . . .	252,213	220,412	8,816½
Berkshire County, . . .	240,899	293,072	9,158½
Franklin County, . . .	223,359	253,616	7,925½
Bristol County, ...	164,064	210,235	7,786½
Essex County, ...	158,264	186,031	5,471½
Norfolk County, . . .	112,132	150,465	4,299
Plymouth County, . . .	105,243	139,617	5,171
Barnstable County, . . .	52,639	70,480	3,524
Dukes County, ...	12,395	16,023	763
Nantucket County, . . .	3,206	7,980	380
Suffolk County, ...	2,691	3,256	88

The number of acres of Indian corn cultivated in Massachusetts in 1855 was 91,056. The number of acres in 1858 was undoubtedly considerably larger, and the yield, as nearly as can be estimated from various data, about 3,643,440 bushels,

which, at the price of eighty-three cents per bushel, is valued at $3,016,155.

The statistics given above are sufficient to show the comparative importance of this crop in the agriculture of countries adapted to its growth. Some account of its history, its varieties, its cultivation and its uses, can never be out of place, therefore, in treating of the crops most profitable for cultivation in American agriculture.

The vast importance of this plant has naturally attracted the attention of agricultural writers, and no point connected with it has passed unnoticed. It can hardly be expected, therefore, that the subject can be invested with any great degree of novelty, or that much can be said which has not been said before. Something may, however, be done by way of bringing together the information which is now scattered and inaccessible to the great majority of readers, while on some points, the results of practical experiments may be of service to the farmer and contribute something to our present stock of knowledge. Nor is the labor required to do this so trifling as might at first sight be supposed, for it must be borne in mind that on the most important practical points connected with its cultivation the opinions of farmers differ widely, and even the results of experience, and the statements of practical men are in many cases full of contradictions and discrepancies which it is not possible to explain or reconcile.

Most farmers have opinions upon the questions which suggest themselves to the mind of the inquirer, but few possess a sufficient store of facts to satisfy his expectations. Who can say with certainty what variety is best for particular localities, or from what part of the ear the seed should be taken, or whether it is best to prepare the seed by soaking previous to planting, or not? Who can give the exact depth at which the land should be ploughed for corn, the kind and quantity of manure it is best to use, the distance the hills or the drills should stand apart? How many can say with exactness what is the cost and the profit of raising an acre or a bushel by any particular method of culture? Or who even with the aid of a thousand reports of agricultural societies, can form a practical opinion as to whether this will be the most profitable crop for him to cultivate in his own field? Even in Massachusetts, the

statements of practical farmers differ so widely that some estimate the cost of cultivating an acre at ten dollars, and others at seventy-five. One farmer shows a profit of seventy-eight dollars from an acre; another says he can clear the stover, while another can barely make it pay the cost, and if he can keep the homestead in his own hands, it is all he expects to do in raising Indian corn.

There are, no doubt, great difficulties in the way of forming an accurate estimate on these points. The culture of Indian corn is usually connected with that of other crops and other farming operations, and it requires much time and care to arrive at a result absolutely correct on many of the points of investigation; and few men have the time to devote to it, to say nothing of the infinite number of varieties of corn, each of which modifies the result; to say nothing of differences of climate, soil, elevation, exposure, facilities of marketing, command of labor and manures. These items may have an ultimate certainty in them, but it is rare that they are all so closely observed and noted as to enable an individual unacquainted with the locality to grasp and understand them all.

I cannot hope to answer the innumerable questions which suggest themselves on this subject, but I shall endeavor to indicate in the course of the following pages, some points which may be considered as already settled, and others on which we need further information, more accurate observation and experiment, and more exact and careful statements of the results attained.

As already said, Indian corn has often been the subject of scientific investigation, both in Europe and this country.

In 1784, M. Amoureux presented a memoir upon maize to the Academy of Sciences at Bordeaux, France. In 1785, M. Parmentier wrote on Indian corn an essay which was crowned by the Royal Academy of Bordeaux. In 1788, Signor Harasti published in Italy, "Practical Instruction" on the same subject. In 1809, M. Burger wrote, in Germany, a work "On the Natural History, the Cultivation, and the Use of Maize." Other works on maize appeared in Europe from time to time.

In 1828, William Cobbett sought to give his name to it and introduce it into England. He eat it, he smoked its husks, he planted it, imported it, published a book printed on the husks,

and finally published a work upon the subject. In 1836, M. Bonafous, of Sardinia, published at Turin and at Paris a magnificently illustrated book on the native country, the varieties, the cultivation, the harvesting, the maladies of Indian corn, and the use of it in the family, the farm, the arts, and lastly, in relation to health and in medicine.

In the United States, though no complete and elaborate work has been written upon it, the shorter essays and articles upon the subject are innumerable.

The materials for a complete civil history of Indian corn must be sought for in old and uninviting volumes, in the narratives of voyages and travels, and in no less than five or six different languages. One should know something of the botany of the western continent, as well as of Asia and the Asiatic isles, to be able to draw the most natural and correct conclusions. I have mentioned several works on Indian corn. In Spain, though no very valuable work has appeared on its history, such frequent allusions are made to it in the narratives of the voyages of Columbus, Alonzo Vega, Penzon, Vespucci and Cortez, as to be of very great service in determining its native country. The works of Oviedo and Hernandez, also, are worthy of mention. Still more important is the authority of Humboldt.

Naturalists have long disputed the origin of maize. The question is one of some interest, inasmuch as some claim our own as its native country, while others contend that it came from the East. It is proper to state, briefly, the argument as it stands, after which we shall be better able to draw somewhat satisfactory conclusions.

Bock, the first botanist who wrote of it, forty years after the discovery of America, asserts that it came from Arabia, and was called *wheat of Asia*, (ble d'Asie,) *great wheat* and *great reed*. But four years after, the same opinion is maintained by Ruellius, whose assertions are perhaps worthy of respect. Fuchsius also declares that it came from Asia to Greece, thence to Germany, and was called *wheat of Turkey*, because the Turks at that time possessed all Asia. Many writers have taken the authority of the old map or chart of Incisa, of the thirteenth century, to prove that it came from the East. Of such we may mention Sismondi, M. Michaud, Gregory, Lonicer, Amoreux, and Reynier, who was familiar with the history of agri-

culture. This chart describes a grain of a golden color, and partly white,—"granis de colore aureo, et partim albo,"—under the name of *meliga*. Crescenzio describes the method of cultivating this grain, which is very nearly the same as that of cultivating maize at the present day. The Portuguese writer, Sata Roza de Viterbo, also, asserts that it was known in the thirteenth century. Whatever may be said of its origin, it seems to have been first introduced into Turkey, from whence it made its way to the West. This is shown by the names which have been given to it in Europe, several of them indicating that it came through Turkey. But according to some Spanish authors, it was brought into Spain by the Arabs. A Chinese writer of the middle of the sixteenth century, draws the figure of the maize as known in China, which is said to correspond with some species of maize now known. Some travellers who have visited the Asiatic isles, have inferred that it was cultivated about the equator, in that vicinity, from great antiquity, and that it passed from these isles into China, and thence to the interior about the Himalaya. John Crawford, who lived for years in the Island of Java, says: "Maize is, next to rice, the most important agricultural product among the great tribes of the Indian Archipelago." Mr. Rifaud asserts that some kernels were found in the sarcophagus of a mummy in Thebes, in 1819. The well known orientalist, D'Herbelot, mentions, a passage of Mirkond, a Persian historian, which might lead us to suppose that maize was known to the old world, long before the discovery of the new.

Now the question arises, whether the meliga described in the old chart of Incisa alluded to, was identical with the zea mais? Bonafous says on this point, that the description of the meliga from the East corresponds to maize, but that according to the learned author of the "Flore d'Egypte," in the description published by order of Napoleon, it can equally well be applied to the millet of India, in which the grains pass in some of the varieties from yellow to white. But Cardan says, distinctly, that maize strongly resembles the plant known in Italy as melica, or *sorghum*, which is the meliga of Incisa. So of several other authorities, as Matthioli and Georges de Turre. Moreover, Bonafous himself declares that it is evident, to look at it, that the meliga is a real maize, and he is, therefore, inclined to believe that it was known in Asia and Europe before the discovery of America.

After this accumulation of evidence in favor of its eastern origin, it is worthy of remark that some have even asserted that it was known to the ancient Greeks and Romans. But such conjectures as that the black millet brought from India to Italy in the time of Pliny, was the maize, are probably ill-founded. Even Mr. St. John, whose great familiarity with the domestic affairs of ancient Greece entitles him to the highest respect, says: "In the region beyond Bactria, a species of corn was found which must unquestionably have been maize, since the grains are said to have been as large as olive stones, and to maize alone can we apply Herodotus's description of the wheat found in Babylonia, the straw of which was encircled by leaves four inches in diameter, and its return from two to three hundred fold. Now in wheat I believe so prodigious an increase is all but impossible; whereas a still greater return might be obtained from the Indian corn." And there have not been wanting those who think that Homer distinctly mentions maize, as well as the naturalist, Theophrastus, in his history of plants, and that allusions are frequently made in the Bible to a grain that could have been no other than maize or Indian corn. Such was the opinion of William Cobbett. It arose, however, from utter ignorance of the ancient mode of planting or sowing wheat, which will be alluded to hereafter.

It is now proper to enumerate, briefly, the authorities on the other side of the question; those who believe maize to be indigenous to America, and that the New World should have the credit of having given it to the Old. And here, it may be, we shall find naturalists not less celebrated than those already mentioned. Among the first, in point of time, is Dodonæus, who lived in the middle of the sixteenth century, and wrote but shortly after Bock and Fuchsius. After him came Camerarius, then Matthioli, one of the most learned and justly celebrated men of his time. He affirms that Turkish wheat (*ble turc*) is not a proper name for maize; that "it should be called Indian wheat, (*ble d'Inde*,) and not Turkish wheat, because it came from the West Indies, and not from Asia nor from Turkey, as Fuchsius believes." So Ray and others say that Fuchsius was mistaken, and that it came from the New World. M. Dumeril thinks it was called Turkey wheat in consequence of its long stalks. So the authority of Heynius is to the same effect.

Turcici nomen non ex vulgo accepit, quod ex Turcorum terris exportatum fuit, verum *ab aristarum similitudine aliqua cum crista seu pluma in apice Turcorum capitibus imposita.*

Gerard, after describing several kinds of "Turkey wheat," which were evidently species of maize, goes on to say: "These kinds of grain were first brought into Spain and then into the other provinces of Europe, not (as some suppose) out of Asia Minor, which is the Turk's dominions, but out of America and the Islands adjoining, as out of Florida and Virginia, or Norembega, where they used to sow, or to set it, and to make bread of it, where it groweth much higher than in other countries." He also takes care to say that it was not known to the ancient Greek and Latin authors. M. Parmentier is of opinion that it had an American origin.

M. E. Discourtilz also says maize was introduced into Europe by the Spaniards, who brought it from Peru. It is important to mention, also, the authority of Thomas Nuttall, who thinks it was indigenous to tropical America. The same conviction is expressed by the learned Mrs. Somerville.

It remains to speak of the important conclusions of Baron Humboldt. "It is no longer doubted," says this learned naturalist, in his Essay on New Spain, "it is no longer doubted among botanists, that maize, or Turkey corn, is a true American grain, and that the old continent received it from the new." Again, he says: "On the discovery of America by the Europeans, the zea maize (*tlaolli* in the Aztec language, *mahiz* in the Haitian) was cultivated from the most southern part of Chili to Pennsylvania." Massachusetts, he might have said, for such was the case. "According to a tradition of the Aztec people, the Toltecs in the seventh century of our era, were the first who introduced into Mexico the cultivation of maize, cotton, and pimento. It might happen, however, that these different branches of agriculture existed before the Toltecs, and that this nation, the great civilization of which has been celebrated by the historians, merely extended them successfully. Hernandez informs us, that the Otamites even, who were only a wandering and barbarous people, planted maize." Thus we see it was cultivated in America long before the discovery, and formed a most important article of food for centuries.

Having candidly stated the various authorities on this question, we are now prepared to proceed in our investigation. And first, let us say, that though we should consider it no small gift of the New World to the Old, it is not difficult, on a question which does not affect either personal or national honor, to free our minds from prejudice and partiality, and study with a desire to ascertain and establish the truth. We are not convinced, by the assertions of some or by the arguments of Bonafous and others, that maize originated in the East. They have not made out a satisfactory case. It should be borne in mind that the authority of the early writers is not always to be relied upon. They possessed none of the advantages which modern science has laid open, to pursue their investigations. They could not be accurate on questions of this nature. It is very probable that maize came into Europe by way of Turkey and the Levant, which gave it the name which it then bore, of Turkish wheat, &c., and which would be likely to deceive a naturalist of the sixteenth century, in regard to its origin. Then it is very easy to conceive how a careless statement made by a writer three hundred years ago, would be taken on his authority, and thus gain a credit which it did not deserve. Instances of this occur on almost every page of the old historical writers, as any one who is at all familiar with the works of Sir Thomas More and the old chroniclers, can testify. The name Turkey or Ble Turque, or even Ble d'Inde, is no proof, because we know that the very word "Turkey" in English and "Dindon" (D'Indon) in French is applied to a bird that is allowed to be indigenous to America, and not elsewhere.

It is a remarkable fact that maize is not mentioned by travellers who visited Asia and Africa before the discovery of America. These travellers to foreign parts were often very minute in their descriptions of the productions of the soil. But the maize was never described in Europe until after the discovery. This most certainly argues very strongly that it was not known. In fact it was introduced into Africa by the Portuguese, in the sixteenth century. Into Europe at the beginning, and into England in the middle of that century.

It is also a remarkable fact, that it was universally cultivated on the western continent at the time when the Europeans landed here. This is proved by P. Martyr, Ercilla, Jean de

Lery, not to mention Torquemada and others, who tell us that the first Europeans who set foot on the New World saw, among other wonders, a gigantic wheat with long stalks, and that this wonderful wheat was the maize. The harvesting of it was celebrated by the people with religious festivals. Sacrifices were prepared with it: With it the Mexicans formed idols. It constituted almost the only food for all the tribes in Mexico, in Peru, in Brazil, at the Orinoco and the Antilles. It served for money. A theft of seven ears the Mexican laws punished with death. The Mexicans offered the first fruits of their corn to their goddess Centl; they called its leaves Tonacayohua, or "she who feeds us," and their maize feasts were annually held in May, by the Incas and their followers, on an island in Lake Titicaca. Garcilasso de la Vega, one of the earliest Peruvian historians says, the palace gardens of the Incas were ornamented with maize in gold and silver, with all the grains, stalks, spikes and leaves; and in one instance, in "the garden of gold and silver," there was an entire corn field of considerable size, representing the maize in its erect and natural shape; a proof no less of the wealth of the Incas than of their veneration for this important grain. At the old ruins of Copan and Central America, are found paintings and statuary ornaments of maize. At Cusco, the "Virgins of the Sun," priestesses, prepared of maize the sacrificial cakes which they soaked in the blood of the victims. The Indians of South America call hot and boiled corn, which they eat, "mote," and the Creole Spaniards there call their hot corn cakes "Arepas."

The Indians at Nemasket, (in Middleborough, Massachusetts,) in 1621, regaled some of the Pilgrims with bread called mazium, made of Indian corn.

In Canada, while the Adirondacs hunted, the Five Nations or Iroquois, *made planting of corn* their business. The Lenni Lennape, (or original people,) the grandfathers of the other Indians, called maize "Lenchesquen," the original or native grain. The natives of North America called it generally wiachim, while in some southern parts they called it mayse.

It is a still more curious fact, that immediately after its introduction into Europe, it spread with great rapidity into every country and province where the climate was thought to be suited to it. Now if it had been known in Asia, if it had been

cultivated by the Turks, how could all these things have happened? Why was not so useful a grain introduced into Europe before, or why did it spread so rapidly when it was introduced? A somewhat extensive trade was carried on between Europe and some of the Asiatic Isles, long before the sixteenth century, so that if Indian corn had been known or cultivated in Asia, there is every probability that it would have found its way into Europe. The plant called *sorghum* was known and cultivated in Europe and somewhat in Asia and Africa, and this it was with which maize was so often confounded. This, however, was not a species of Indian corn. In Germany, in 1532, forty years after the discovery of America, Indian corn had the name sometimes of Asia wheat, grand grain, and giant reed, and Turkish corn of Asia, which it actually keeps now, and grain of India, confounding it with what they had before known. In the Indian Archipelago it is called the Yagoong, or the native, as the Lenni Lennape in America called the true maize. But this Yagoong, and the meliga of Asia Minor and Italy, in 1204, and the milhom of Portugal, in 1259, the picture of the Chinese Li-ti-chin in 1578, the stalk eighteen inches long with its leaves and the "grains of maize" in a little earthen cup found in the Theban mummy, by M. Rifaud in 1819, and the notions of an origin for Indian corn different from America, all arose from mistaking it for the sorghum, that is just now exciting so much attention with us, and to which is often applied at this day, the name of small maize.

But the strongest evidence of its American origin is, it seems to us, that it has been found growing wild in some parts of the western continent, which is not the case in any other part of the world. This alone would seem to prove it to be indigenous to America. We need say nothing of the fact that grains of Indian corn have been found in the graves and mounds of Peru and of Mexico. These mounds were probably built three or four hundred years before the conquest. There can be no doubt, therefore, that it was cultivated on this continent from time immemorial. For we have now, in the discovery of the Indian corn wild in Paraguay, and elsewhere in South America, the proof which M. Bonafous required after an examination of all that had been written and said upon the subject. "La premiere habitation du máis restera incertaine, jusqu'à ce qu'on

découvre le lieu ou il croit sans culture, si les revolutions que la terre a subies ne rendent cette dècouverte impossible." The original home of the maize will remain in doubt until they discover where it grows wild, if the changes of our earth do not render such a discovery impossible.

But it may now be asked, how are we to explain the numerous allusions to a grain, which if not Indian corn, must have nearly resembled it? We have already remarked that many of the assertions of the early botanists confounded maize with sorghum. Other allusions, and those by the sacred writers, refer to wheat, which was indigenous to Asia, and almost universally cultivated. Mr. St. John admits that there was, and still is, in that part of the world, "a very large grained wheat called camel's tooth," which would naturally have given rise to the expression, "ears of corn," so often used. The misconceptions of Mr. Cobbett and others, in regard to these references, arise from ignorance of the ancient mode of sowing wheat, or corn, as it was universally called by the old writers. Large fields of it were sown, between which a narrow road or path was left for the public. This road was just wide enough for the carriage to pass without injury to the grain, there being no fences for protection, so that it might literally be called "going through the cornfields." It was sometimes gathered with the sickle, sometimes by passing through it and plucking off the heads or ears, the reaper having an apron or pouch to drop them into.

Neither wheat nor rice were known to the first inhabitants of America, and we may with as much truth say, that Indian corn and the potato were neither cultivated in Asia nor the South Sea Islands.

It is well known that maize was introduced into Japan by the Chinese. But there are no grounds for believing that the Chinese themselves possessed it until the sixteenth century. We persist, then, with Humboldt, in believing that maize was not transported from the centre of Asia to the table lands of Mexico. And, moreover, if we suppose that it was thus transported from Asia, how are we to account for the infinite varieties found in America, which, most certainly, were not found in Asia? Is it not more natural to suppose it to have originated where every variety of it was found, than where only

one or two varieties, if they were of this species at all, were ever known to grow before the discovery of America by the Europeans? We may remark, also, that if we suppose that a species of maize was actually known in Central Asia, or to the Chinese, it may have been the case that the Indians of the extreme north-west of America had communication with the extreme north-east of Asia, and that some one or two species, by this means, found their way into Asia. If such communication existed, which we do not believe, the fact that it was found in China and about the Himalaya, which is by no means established, would not prove it to be indigenous to Asia. Or, if one or two species were actually found, the fact that there were no more in Asia, and so many in America, would be a strong evidence of its being exotic in Asia. It might have drifted, as many things are known to have done, by sea, from America to Asia.

This accumulative evidence seems to us to be satisfactory and conclusive. It was the custom among some of the earlier writers, to speak of America as being sterile and wanting in the most important vegetable productions. They little suspected the surpassing richness of the country which had been made known to astonished Europe. The infinite variety of plants indigenous to Mexico, to Central and to South America, where we suppose maize to have originated, is beyond description. No country on the globe can excel them in the boundless luxuriance of native, indigenous plants. Here even the giant trees of the forest are loaded with flowers of every hue and variety. The purple and the blue and the scarlet, the brilliant yellow and white, twine and mingle with every variety of green. Here are the fig, the sugar-cane, the indigo, the aloe and the pepper plants, the passifloræ, the pine apple and the endless varieties of the cactus with its splendid and variegated blossoms. Here is the night-flowering cereus, the alspice myrtle, the clove, the nutmeg, mango, guava, and an infinite variety of palms, rising often to the height of two hundred feet. Here, too, are forests of logwood and mahogany, of colossal grandeur, often surrounded with shrubbery and parasitic plants, with a foliage so dense that the rays of the sun can never penetrate. Here is the mimosa, majestic in its size, the beautiful acacia, and grasses that rise to the height of forty and fifty feet, with tree ferns and reeds without number, often seen a hundred feet

high. The golden and rose-colored bignonias add their grace and beauty to the teeming masses of blooming life. The laurels become splendid forests. Plantains grow to gigantic size, and beneath all spring lilies and bulbous plants as if not an inch of soil could be spared. Here, also, the endless variety of creeping plants rise through the twining limbs with their myriad and brilliant flowers. Thousands of species still remain undescribed, and there may be thick and tangled forests which the foot of civilized man has never trodden. Nor is this rich luxriance for a season alone; for the spring, or the summer, or the autumn. It is everlasting. The unfading verdure hides the very appearance of death. The trunks of decayed plants, matted and heaped together, form only rich beds for the living to spring forth in the newness of life. The eye is sated with beauty. The air is filled with perfumes, and one is lost in wonder and amazement at nature herself. This is the native country of maize. A country unparalleled in the magnificence of its flora, and unequalled in the depth and richness of its soil!

America has received from the old continent, wheat, barley, oats, rice, cotton, coffee, oranges, lemons, peaches, and other useful plants, while she has well repaid them with Indian corn, the potato, tobacco, cocoa, vanilla, and other grateful productions.

The names of Indian corn are various. Its synonyms in different languages are as follows: (English,) maize, Indian wheat or Indian corn, corn. (French,) mais or máis, Blè or Bled de Turquie ou d'Espagne, ou d'Inde. (Spanish,) maiz, Trigo de Indias, Trigo de Turkuia. (Italian,) Grano d' India, Grano Turco, Grano Siciliano. (Portuguese,) mais, milho da India, milho grande. (German,) mais, Turkischer korn. (Dutch or Belgic,) mais, Turksch koorn. (Swedish and Danish,) Turkish Hvede, korn. (Russian,) Tureskvichljeb. (Chinese,) La-chou-cha. (Aztec,) Tlaolli. (Quichua,) Cara. (Mexican,) Centli. (Lenni Lenape,) Lenchesquem. (Quonnetiquots, &c.,) wiachin. (Coosaws, &c.,) mayze. (Haytian,) mahiz, whence M. Tourneport in France adopted it in his botanical nomenclature, and it was there established by Gaertner and De Candolle.

It is curious that the word maize in the Gaelic or Irish is "food." In the Lettish and Livonic language in the north of Europe, mayse is "bread."

The word corn is from the Saxon "corn," the Dutch koorn, and the German, Danish and Swedish "korn." This word is the same as for grain, and is used for that grain which is the general one of the country. The edible seeds for man are called bread corn unless when growing in pods, when they are called pulse. In England corn means all grain, as corn laws, corn exchange—but especially "wheat;" in Germany, rye, which is the grain almost exclusively in use there as food; in the Scandinavian Peninsula, barley, and in the United States, maize. A Pennsylvania court has decided in that State at least, that "corn" means maize, Indian corn.

In the United States corn was first cultivated by the English on James River, in Virginia, in 1608, and according to the Indian fashion. The yield then was from 200 to 1,000 fold, and the same increase was noticed by the early settlers in Illinois. The cultivation has increased continually since then, and in no State has it retrograded. In New England it has increased fifty per cent. since 1850, and it increased the same in the ten preceding years in New England, New York, Pennsylvania, New Jersey, Maryland and Delaware. From 1840 to 1850, when it was 592,000,000 bushels, it increased in the United States, forty-six per cent. In Illinois it increased sixty per cent. in ten years. In 1858, in the United States, the crop was probably 670,000,000 bushels.

Indian corn is one of the natural grasses. The grasses are variously divided and classified. Some are designated as natural, some as artificial; the former name comprising all the true grasses, that is, plants with long, simple narrow leaves, each leaf having many fine veins running parallel with a central prominent vein or mid rib, and a long sheath divided to the base, which seems to clasp the stem, or through which the stem seems to pass. The stem is generally hollow, but Indian corn is one of the few exceptions and is solid, and closed at the nodes or joints. The artificial grasses comprise those plants mostly leguminous, which have been cultivated and used as grasses, though not of that family, such as the clovers, sanfoin and medic. But in botanical language, and speaking precisely, the

gramineæ or grasses embrace most of the grains cultivated and used by man, as Indian corn, wheat, rye, barley and rice, all of which will be at once recognized as having leaves and stems very similar in shape and structure to most of the plants popularly called grasses.

Botanists having arranged Indian corn in the order *gramineæ*, or the grass family, and specify it as *Zea mays*. The genus *zea* comprises in fact but one species, the common or cultivated maize, and is distinguished by its simple leaves. The *zea caragua* or stone maize has sometimes been regarded as a distinct species, but I think with little reason. It was introduced from Chili. *Zea Hirta*, the hairy maize, having its leaves and husks hairy, and its spikelets sessile or seated close on the male flower, instead of being pediculated or on footstalks, like the common maize, came from California. *Zea Erythrolepis*, or red husked corn, with grains compressed, and glumes red, and *Zea Cryptosperma*, or covered maize, each grain being inclosed in a husk, and the whole ear included in a general husk, as usual, are other varieties. The last comes from Oregon and is found also in South America. It is the same as *mais tunicata*, or cloaked maize, which is found growing wild in Paraguay.

Zea comes from a Greek word meaning to live, because of the great amount of nutritive matter that it contains ; mays is the Haytien name.

Indian corn or maize, in the artificial arrangement of Linnæus belongs to the order *Triandria Digynia*, having three stamens and two styles, or, as we have seen, in the natural arrangement of Jussieu, to the order *Gramineæ.* It is endogenous or growing from within. Its fertile and sterile organs are arranged on distinct parts of the same plant, the former on the side of the stalk and proceeding from the joints, the latter, terminal, or on a panicle at the top, called the tassel. The stem or stalk is seen in Fig. 2, while the male or sterile flower is shown in Fig. 3, and the fertile or female flower, in Fig 4.

The cylindrical stem, column or stalk, as shown in the figure, rises from joint to joint, clasped by the sheath of the leaf, and at the apex, is seen the tassel, separating into several spikes on which the sterile flowers are arranged. These contain the stamens each on a little stalk or filament supporting an anther or bag filled with fine pollen or powder.

At a particular stage of the growth of the plant the anthers of the tassel above, bursting, scatter their pollen in clouds, as may be seen by shaking the stalk at the proper time, and this being heavier than the air falls down on the open ends of the

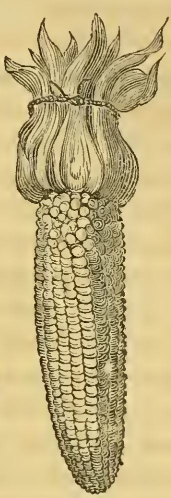

FIG. 5

FIG. 6.

FIG. 3.

FIG. 2.

FIG. 4.

stigmas or silks below, and fertilizes the new germ. Then and not till then, the new seed begins to enlarge, and becomes, what it could not be without this particle of pollen, capable of sprout-

ing and producing other plants; so that if Indian corn is plucked while "in the milk," it will germinate or sprout and grow the next year almost as well as if it is allowed to ripen, for the germ is the first part of the seed that is distinctly formed.

If the silk does not receive any, or too little of the pollen at the proper time, or if the silk is destroyed by insects or other injuries, an abortive or rudimentary or nubbin ear is formed if any; and if such injury happens to single silks the grains to which they are attached will not fill out. That is the case with the kernels at the top of the ear, where the silks are most exposed and oftenest fail of their pollen, as being late and not grown till most of the pollen has fallen, which therefore appear either diminutive or imperfect.

It is said that "suckers," or the subordinate stems that often shoot from near the root of the main stalk, are frequently useful to supply the pollen necessary for the growth of the kernel of the silks just mentioned, which start from the upper end of the cob, and are later in forming than the others. If the suckers are left in tassel, those grains will sometimes fill out as large as the others, but the necessity for them occurs but seldom.

The seed is covered, when mature, with a thin pericarp, or hull, which originally formed the ovary or fruit.

The albumen or substance of the seed or grain, is farinaceous or mealy. These seeds are rounded at the surface, compressed at the sides, and arranged lengthwise of the ear or cob of the ear of corn which contains about six hundred grains, in from eight to thirty-six rows, but the number of rows is always even; when there are casually less than eight rows, there is a vacancy on the side of the cob.

Indian corn is an annual grass, and grows from four to twenty-two feet in height, its stalk having from one to ten ears.

As soon as the tassels are seen, or a little before, when the height is attained, and the ears begin to grow and the whole plant is heavy, prop roots often grow out in a complete circle from the joint at the surface or just above the ground,—sometimes higher,—to at least a little distance out; but becoming abortive, hard and woody by exposure to the air, then branching and feeding after reaching the ground so as to be strong and support the large plant, and to assist it in obtaining additional

sustenance just at the time of its growth when it wants the most of it.

The roots of Indian corn spread to at least the same horizontal distance under ground, on an average, that the leaves do above ground, and both should have room enough, but more than enough is waste of ground and crop.

The seed germinates and the plant appears above ground in from five to eight days after it is planted one or two inches deep, depending on the variety of seed, and the heat and moisture of the soil, and its depth and preparation. It ripens fit to be harvested, according to the variety of seed, the cultivation, the aspect and the weather, in from sixty to two hundred and ten days, and yields its increase variously according to climate, soil, cultivation, aspect and kind, from ten to two hundred bushels of shelled corn an acre, the corn varying in weight according to the variety, and some other casual circumstances, from fifty to sixty-five pounds a bushel.

It will appear from the analysis of Indian corn, that it contains not far from 68 per cent. of nutritive matter. The amount from an acre yielding 30 bushels, or 1,800 pounds, is about 100 pounds of woody fibre, 1,260 pounds of starch, sugar, &c., 216 pounds of gluten, from 90 to 170 pounds of oil or fatty matters, and 27 pounds of saline matters. According to one analysis, Indian corn meal consists of nine per cent. of oil or fat producing principles, increasing with the degrees of temperature in which it ripens, twelve per cent. of nitrogenous elements or flesh producing principles, fifty per cent. of non-nitrogenous or heating principles, with the remainder consisting of water, woody fibre and saline matter.

As compared with wheat for human food, 138 pounds of Indian corn are equal to 100 pounds of good wheat flour, to 171 pounds of rice, to 613 pounds of potatoes, to 810 pounds of cabbage, and to 1,335 pounds of turnips.

The cob, though but slightly nutritive, contains some heat-producing elements and some materials which aid in the formation of flesh and bone.

The following analyses by Dr. C. T. Jackson, show the nutritive matter in cobs of Indian corn, and how much of each mineral salt they had extracted from the soil where they grew in Smithfield, Rhode Island. It was Canada and Red Cap mixed,

four ears to a stalk. Weight of cob, 280 grains; weight of kernels, 2,070 pounds; number of kernels on an ear, 325; yield, 1,314 grains from 1. This corn yielded 4.75 per cent. of fat at its height, in refined oil, and 4.11 per cent. in sugar and zeine. The cob ash, 1,000 grains yielded in potash, 3.204; soda, 0.492; phosphate of lime, 1.000; phosphate of magnesia, 0.260; phosphoric acid (in the alkalies), 0.300; silica, 0.800; chlorine, 0.196; peroxide of iron, 0.360; unburned charcoal, 1.500; carbonic acid and loss, 1.388. The cob yielded a drying yellow fined oil, 0.323 per cent.; sugar, 0.242; dextrine (gum) and some albumen and extractive, 2.557; loss, 0.023, or about 3.145 per cent. of the whole weight of the cob.

Analysis of the ash of Burr's improved wrinkled sweet corn. Cob weighed 480 grains, short and thick, and quite large in proportion to the depth of the kernels. Powdered cob, gave dry oil, 0.179 per cent.; sugar, 0.065; brown extractive matter, 0.242; gum and albuminous matter, 3.257; oil, 3.743 per cent. of the whole cob. The ashes gave, potash, 0.2581; soda, 0.2104; silica (flint), 0.1250; phosphate of lime, 0.0521; phosphate of magnesia, 0.0279; oxide of iron, 0.0416; phosphoric acid, 0.0292; chlorine, 0.0292; carbonic acid and coal, 0.0812. Total, 0.8545 grains or per cent. of the whole cob.

Analysis of lot of Maryland white Southern corn; cob weighed 290 grains, was short but not large. Potash, 0.4585; soda, 0.1211; silica, 0.1720; phosphate of lime and magnesia, 0.0800; oxide of iron, 0.0420; phosphoric acid, 0.0290; chlorine, 0.0340; unburned carbon, 0.2242; carbonic acid and loss, 0.5872. Total, 1.7480.

Analysis of Southern corn, a red variety from Cape May, New Jersey. Cob weighed 560 grains. Potash, 0.450; soda, 0.220; silica, 0.103; phosphate of lime and magnesia, 0.054; phosphoric acid, 0.091; chlorine, 0.011; oxide of iron, 0.032; unburned carbon and carbonic acid, 0.389. Total, 1.350.

Analysis of cob of Tuscarora corn, Longmeadow, Connecticut River, Massachusetts. Large grained, rich in starch. Cob weighed 630 grains; potash, 0.6430; soda, 0.1970; silica, 0.0714; phosphate of lime, magnesia and oxide of iron, 0.0800; phosphoric acid, 0.0800; chlorine, 0.0630; unburned carbon, 0.1430 oxide of iron, carbonic acid and loss, 0.6590. Total, 1.9364.

Analysis of cob of Dutton corn, Massachusetts. Small, yellow kernel, large cob, weighed 830 grains; powdered dried cob. Fixed drying oil, 0.249; sugar, 0.333; gum, albumen and astringent extraction, 2.700. Total, 3.282. Cobash, yielded potash, 0.410; soda, 0.174; silica, 0.135; phosphate of lime, 0.042; phosphate of magnesia, 0.020; phosphoric acid, 0.023; oxide of iron, 0.038; chlorine, 0.049; unburned carbon, 0.127; carbonic acid and loss, 0.255. Total, 1.353.

The analysis of Indian corn may be given as follows:—

Silica,	38.45
Potassa,	19.51
Phosphate of lime,	17.17
Phosphate of magnesia,	13.83
Phosphate of potassa,	2.24
Carbonate of lime,	2.50
Carbonate of magnesia,	2.16
Sulphate of lime and magnesia,	.79
Silica, mechanically found,	1.70
Alumina and loss,	1.65—100

Making, in all, one hundred parts. In other words, there are in it, of

Fat forming principles, gums, &c.,	88.43
Flesh forming principles, gluten, &c.,	1.26
Water,	9.00
Salts,	1.31—100

A glance will show how greatly the fat-forming principles predominate in the one hundred parts. There is hardly any other grain which yields so much for the support of animal life.

It was with reference to these facts, that Boussingault and others formed their Tables of Nutritive Equivalents, that is, of the comparative amount of flesh, or fat, or bone, or milk-producing substances in different articles of food for man and beast, and they agree very closely with the results of practical observation. Of course there will be some slight variations in difference of climate and soil, but they will not be of any great

practical importance. This Table of Equivalents was given in my Fourth Annual Report, page 135.

The varieties of Indian corn are very numerous, as its flexibility of organization makes it easy of adaptation to different climates and soils, and they are constantly changing in character and in number, from the shrubby reed on the shores of Lake Superior, to the giant stalks of the Mississippi Valley—the tiny ears with flat, close, clinging grains of the Canada—the brilliant, rounded little pearl—the bright, red grains and white cob of the eight-rowed hematite—the swelling ear of the big white, and the yellow gourd seed of the South.

Though it prefers moist and rich soils with strong heats, and in the warmest regions, three crops can be taken in a season, yet some varieties grow at the height of seven thousand feet above the level of the sea in those regions. There are said to be one hundred and twenty varieties in Spain. M. Bonafous mentions ten varieties of white, twelve of yellow, and one of red, and one variegated purple on a yellow ground. Varieties differ from each other in the color, form and size of the grains, and of the cob, and number of rows of kernels on the cob, in their time of maturity, their resistance to cold, to drought and to wet, the weight of the grain, the tendency to keep, and the chemical and economical characteristics; and there are many differences and many grades of value as fodder. The general preference is for clear white or yellow, large ear, with a small cob, long, heavy grain and early ripening.

The varieties of Indian corn differ so much in their various qualities, that the farmer must always know what he is planting and select according to the uses he will make of it, the length of season where he is, and the weight on an acre. The Canada corn ripens in 100 days from planting; the Rocky Mountain requires 140 days. Long Island corn is said to grow on a given space, 10 lbs. 12 oz., while the twelve-rowed red variety, on the same space would grow 15 lbs. 2 oz.; but on a different soil and different climate the Long Island would exceed the twelve-rowed in its returns. The large late white flint corn yields $2\frac{4}{10}$ tons to the acre, on the same soil where the large twelve-rowed yellow Sioux yields $3\frac{5}{10}$ tons to the acre. Some varieties make muscle most abundantly, others fat. The large, sound, yellow corn contains $13\frac{9}{10}$ per cent. of albumen,

caseine and gluten, which makes muscle, while the Sioux contains $16\frac{5}{10}$ per cent. of these substances; the latter is therefore most profitable, other things being equal, as food for working oxen or horses. The sound square corn contains of starch, sugar, oil and gum, which make fat, $60\frac{6}{10}$ per cent., while the sound, small white flint corn contains $76\frac{6}{10}$ per cent. of these substances, and is therefore far more valuable for fattening cattle or hogs. If the square corn is worth fifty cents a bushel, the flint would seem to be equally cheap at fifty-eight cents a bushel.

The composition and nutritive qualities of corn also vary with the varieties, as they depend on different circumstances. But it is curious that in mixture each variety, though growing on the same plant or ear, retains its power of selecting its appropriate quantity of inorganic salts from the soil. Every yellow flint kernel found on a mixed or variegated ear, shows the same constituents when chemically analyzed that the same quantity on a whole ear of pure yellow flint would show.

Sweet corn contains most phosphates, twice as much as the common Tuscarora, and must take it up from the soil. It has little starch, much sugar and gum, and the small stalks exhaust the land but little. Southern corn contains more starch than northern; common Tuscarora the most, and rice and pop corn the least. Baden corn has a very fine, white oil; rice corn contains most oil; pop corn, Canada, eight-rowed, yellow, brown and King Philip corn rank next. Common Tuscarora has neither oil nor gluten, but the Tuscarora called also Turkey wheat, from New York, yielded 5.32 per cent. of oil.

The southern and Dent varieties of corn have their oil and gluten on the sides of their elongated seeds, and the starch projects quite through the grain to its summit, and by its contraction in drying forms the dent or depression. Pop, called also pearl corn, contains its oil in little subdivided cells in the horny portion of the grain in minute drops. When heated, the oil is decomposed into carbonated hydrogen gas, the same kind we use for light, and it explodes and every cell is broken and the grain turned wrong side out. The meal of oily varieties is less liable to ferment and become sour. The oil being next the hull, if that is not given or digested, the fatty property is lost. The horny and yellow as a general rule have more oil

and nitrogen and less starch, and the indented and white more starch. The inorganic salts, and especially phosphates, are confined to the chit and germ. If a farmer wishes then to give young animals large bones, let him feed them on sweet corn, but at the same time manure with bones or other phosphatic manure. The stiffness of joints and lameness of feet in horses fed too freely with such kinds of corn, may arise from an unnatural growth of bone from the corn. A farmer cannot so easily fatten stock with common Tuscarora, but it makes the best bread and the best and most corn starch. The hard northern gluten bearing varieties are better for working animals and make more flesh than the southern starch bearing varieties, though independent of their oil they make most fat.

The white and yellow gourd seed corn is adapted to the southern States, where they grow large stalks without corresponding increase of grain. The middle States have the gourd seed or flint varieties, pure or mixed, and the crop consists of the big white and yellow, the little white and yellow, and the white Virginia gourd seed; it occupies the ground in the southern or middle States from five to seven months.

The northern and eastern States cultivate almost exclusively the heavy, flinty grained kinds, which grow and mature with great rapidity, and thus accommodate themselves to short northern summers. Like all early maturing corn they are dwarfish, though very productive, and occupy the ground only three or four months—some varieties only six weeks.

The cobs of the big white and yellow are thick and long, grains much wider than deep, thin where they meet; the ends of grain are prominent and round, and the ear looks like a fluted column; so that these hard, flinty corns are less productive in proportion to their cob than the gourd seed. The little white and yellow are more solid and hard than the larger, the yellow color is deeper, they have cobs considerably smaller and are still less productive, but ripen earlier. The grain of all four is firm, without indenture in the ends. The ears of the Virginia gourd seed are not very long, nor the cob so thick as the big white and yellow; but the shape of the grain makes the ear very thick; it has thirty to thirty-six rows of very long, narrow grains of a soft, open texture, almost flat at the outside ends, compactly united from the cob to the surface of the ear, with-

out a fluted appearance, and is by far the most productive, though it ripens later than the others; it is invariably white, unless mixed. If the smallest perfectly natural indenture appear in the grains of the hardest corns, they and their descendants, whatever their color, will come to a perfectly white gourd seed. The Canadian corns are too small to be productive, are solid and very early, but are seldom planted in fields where the larger corns will ripen; though they may be planted closer and if well manured will produce well, while so far as nutritive qualities are concerned, they are among the most valuable.

In the southern United States, the southern or white corn is used for human food. They hold there that the yellow corn of the north is strong and heating, and fit only for brute beasts. In Pennsylvania and in England the southern corn sells higher by the bushel, while the northerners think the reverse, and call the southern or flint corn "horse corn," and insipid, claiming that their own only is sweet and savory, and that the corn grown in high latitudes is always (and the same is said of the sorghum or African corn) richer in saccharine matter than that grown at the south. The kernels of the southern corn are larger and flatter than the northern, and the ears nearly twice as long on the average. Stalks of the southern corn have been measured in eastern Tennessee that were twenty-two feet and three inches long; there are whole fields of it with stalks from twelve to sixteen feet high, and looking like saplings; it rarely bears more than one ear on the huge stalk, and that six or seven feet from the ground. The species most common and valued for human food in Massachusetts are the large yellow, the red, which differs from it only in color, the sweet corn, and what is perhaps the most important, the Canada corn mentioned above. The meal of the northern corn is here considered better, and brings at all times a considerably higher price in our market. In London, in 1851, the price of yellow or northern corn was 29 shillings ($6.38) to 30 shillings ($6.60) a quarter, or eight bushels, or 79¾ to 82½ cents a bushel; and white or southern corn, 30 shillings ($6.60) to 31 shillings ($6.82) a quarter, or 82½ to 85 cents a quarter.

In the Philadelphia market, southern flat yellow gourd seed, for sixteen years up to 1842, averaged 68 cents a bushel, and the Pennsylvania round or flint corn, (Fig. 7,) which is

three to four pounds heavier per bushel, sold at 66 cents, the yellow flat corn, also selling for about three cents a bushel more than the white flat, which is sold but little at Philadelphia, and for an occasional shipment to southern ports.

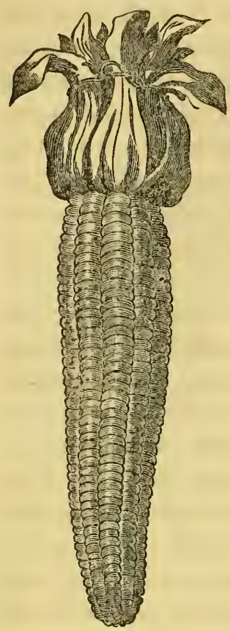

Fig. 7.

The white corns are said to produce more and ripen earlier than the yellow. The white makes much handsomer meal for cooking purposes, and is also free from the strong taste of the yellow, though those from Pennsylvania north, who have been accustomed to the yellow, like that taste. White corn is much cultivated in Rhode Island, and generally commands a higher price for breadstuffs than the yellow. The Sioux or yellow gourd seed, eight-rowed, the Dutton, the smutty white, and the Canada, are mostly cultivated in the other eastern States.

For table corn, the best are the early golden Sioux, Canadian, early Tuscarora, the sweet; and the late sorts, white hominy, and Dutton, when green. For field corn, there are numerous varieties. The favorites in the middle States are the yellow gourd seed, and the Virginia white gourd seed of twenty-four to thirty-six rows. The red, blue and purple corns are not used for field planting; they are sometimes enamelled, even their leaves; the leaves and stalk of the purple are of that color, or between it and green; and some corn has red stalks and leaves, but with more or less green. Jet black corn is found in Mexico. The color of Indian corn usually depends on that of the epidermis or hull, and sometimes on that of the oil, or of the combined particles of which the corn is composed when the hull is transparent, as the golden Sioux is yellow from the oil, and the Rhode Island white flint is white from its starch and oil seen through its hull; but if the hull is opaque, the grain presents the same color, as in the red, blue, and black varieties.

A late writer, in some remarks on the subject, says: What is yet wanted is to determine whether it would be more profitable in our climate to cultivate the early varieties of Indian corn,

which yield a small crop but a sure one, or the later varieties, which are not so sure but are more productive. Perhaps the early varieties may admit of an after crop. No grain can be sown after the late varieties, but after the early Canada is gathered, grass and several kinds of grain might be profitably sown for next year, and get along out of the way of winter injuries. The great desideratum with Indian corn in this latitude is, to increase its precocity without diminishing its productiveness; this may be done by hybridization or mixture of selected varieties, and watching for those which are accidental. And we want yet to learn the difference, if any, of the cultivation demanded by the different varieties, as well as the chemical and economical characters of more of them.

The varieties are owing, as already stated, in part to difference of climate, culture, and soil, but especially to selection, and to mixing of the pollen of different kinds called hybridization.

By examining the characteristics of the different varieties of corn, one can determine what kinds have been mixed to make up any specimen he has, and how to get it back, or to change it to such a mixture as he wishes for any properties or purpose; or he can, by selecting and planting, begin such a mixture as he wants, for it is only necessary to plant two kinds near each other to have them mixed, and in a few years one can get just what he pleases. The long cobs of the big yellow and white may more than make up for the shortening the grains of the gourd seed, and so the mixture, which should always be made under favor of a climate which will ripen it, will be even more productive than the original gourd seed. The little yellow and white should be mixed with the gourd seed for short climates. One fact should, however, be known. Northern corn, it is said, will improve in size and productiveness if removed southwards, but southern corn taken to the north will either not ripen, or soon degenerate.

The change in color, &c., of Indian corn from admixture is generally gradual; we first see scattering, slightly marked looking grains, resembling those from which the mixing pollen has come. By taking care not to plant mixed grains, rejecting all such as seed, and to plant all of one kind together, these mixtures and varieties may be prevented, and the desirable, clear,

uniform kind be obtained. Sometimes a mixture is desirable, and can be made at will, as I stated before.

An instance among several, of success in improving corn, is in Mr. Thomas M. Baden, of Prince George's County, Maryland, who says he begun with common corn of Virginia, which had hardly two ears to a stalk; selected for seed from stalks having most ears, only the sound and ripe, of deepest and best color, and least cob, rejected the irregular kernels at both ends; followed it twenty-three years and more, (several before he saw much improvement,) when he took them only from stalks having more than four ears—some have borne ten. It yielded more shelled corn than other sorts. Ten bushels of ears yielded six bushels of shelled corn; the common corn will measure but about five bushels. He believes he can raise nearly twice as much as of any other corn. He plants about the first of May, hills five feet apart each way, and two stalks in a hill. One hundred and twenty bushels, it is claimed, have been raised to the acre in Illinois, and it produced more fodder than any other kind; it is rather earlier than other corn there. It is a white gourd seed, with stalks twelve to sixteen feet high; ears six to eight feet from the ground, short, and considerably under average size of common varieties; grain excellent; removed a little north, to Philadelphia, it seldom matures properly, being injured by autumnal frosts, like all tall corn; does not answer for high lands, even in the southern valley of Virginia, but produces abundant grain and fodder in the rich, flat lands of the southern and south-western States.

I subjoin accounts of some other striking varieties. The Dutton corn was so called from Salmon Dutton, of Vermont, who introduced it in 1818; it is said to be in the latitude of New England, earlier than any other field corn, being cut from the last week in August to the second week in September; it is twelve-rowed, and though the cob is large, gives the greatest product, as two bushels of sound ears yield one and three-eighths bushels of shelled corn, weighing fifty-six pounds to the bushel.

The white flint corn is cultivated for making the beautiful white hominy of the Philadelphia market. The flour corn, with a round, thick grain, filled with a snowy white powder, resembling starch, is much used in New Jersey for grinding up with buckwheat, in proportion of one-fifth or one-fourth of the corn,

giving the buckwheat meal a lighter color, and otherwise improving it.

In Virginia is found the Tappahannock or Rouzie corn, the result of experiments for thirty-two years; it is said to give more to the acre and more meal to the bushel, than others, even as much as one-third more. Its cob is red, and the fangs of the kernel so tinged. It is said the red cob corn matures more rapidly and perfectly than the white in that neighborhood. It is there planted the first of April.

The Wyandotte corn, first introduced in 1853, by I. R. Thomas, of Waverly, Illinois, who got it from the Wyandotte Indians, is pearl white, and the meal white as wheat flour, large grain, shaped like the yellow flint, soft, twelve-rowed, small cob, twelve to fifteen inches long. It requires but one grain in a hill, more is useless; five feet each way is near enough; perhaps it may, on some lands, be planted closer; 2,500 hills, or one quart of seed to an acre. Each grain yields from three to eight stalks full grown, each nine to twelve feet high. Each stalk bears from two to four ears, so that each hill or grain produces from eight to twenty ears; and if only six,—though Mr. Thomas says his field in 1855 averaged ten ears to the hill,—the yield is 15,000 ears, 120 ears to a bushel, and 125 bushels to an acre. By actual measurement, three of the average sized ears of the Wyandotte corn will make one quart of shelled corn; the largest ears of corn about Albany are mentioned as giving two gills to an ear, and 100 fair ears a half bushel of corn. The accounts of the Wyandotte corn are conflicting. The Indians are said to use it as easily when raised and prepared without a mill; probably its meal will not keep, or do for shipping, as it is almost destitute of oil, and is too tasteless for bread. But others say it yields 8,960 grains from a single kernel.

This matter of varieties is one of the most important in the economy of Indian corn, and we earnestly desire that any one having well-defined varieties, of which he knows the history and qualities, the analysis, ripening, cultivation or yield, in blades, stalk, cob, grain, ear, or height, earliness, hardiness, or any peculiarities and locality, will send a specimen, with a particular and full account of all he knows about it, to the Secretary of the Massachusetts Board of Agriculture at the

State House, Boston, Massachusetts. There is a cabinet to receive it, and each specimen will be labelled and thankfully acknowledged.

Most of the cereals ripen a great abundance of seed, and are therefore comparatively exhausting to the soil. Indian corn yields a larger return for its seed than most other plants, notwithstanding its great nutritive qualities, yet it takes but a small proportion of its bulk, say from ten to fifteen per cent. of its whole weight, though about half of its dry weight, from the soil. Much of its bulk and about half of its dry weight, appears to be drawn from the atmosphere.

Indian corn, like other herbaceous plants, when cut for forage or green fodder, does not exhaust the soil so much as if suffered to go to seed and be harvested. When the offal is properly managed it returns more than other grasses to the soil. It also returns more manure to the farm when used as forage than when used as grain; indeed, in the latter case, commerce too often wholly deprives any given farm of its manure from corn.

An acre of corn, where only twenty-five bushels is to be expected, requires to restore and constantly improve at the same time, 1,000 pounds of inorganic matter to be added to it, which is rather more than twice the amount which a good crop removes from an acre, in its stalks, leaves, roots, husks, cobs and kernels.

Corn will not germinate unless the temperature of the soil is at least 58° Fahrenheit, and not above 110°, for then it never germinates. It requires, during the summer months, or in northern latitudes, two and one-half months for its ripening, with a mean temperature of 65°, which is the limit that permits any yield of corn, and 68° for a profitable return.

When first up it is very susceptible to frost. That and wet weather sometimes require it to be re-planted several times. The early parts of autumn are not so apt to injure the grain in its hardened covering.

The geographical and climatological limits of the cultivation of Indian corn in the latitude of this North American continent, as determined by the mean ripening temperature of 65°, are almost its limit of cultivation at the north, for even in the valley of the Red River, at the parallel of 51° of latitude, a small

variety may be successfully grown, and in the St. Lawrence valley, it is the 47th parallel. The most important exception is a narrow line of the Pacific coast, and to this there is a general addition of some of the most considerably elevated localities in mountainous portions,—say the mountainous elevations of Maine, New Hampshire, Vermont, Wisconsin, Minnesota, and northern New York, east of the Rocky Mountains.

The maximum capacity of the production of Indian corn is nearer its northern than its southern limit, and indeed even in those States where it may sometimes be cut off by extremes of temperature, say Wisconsin, northern Illinois, Michigan, central New York, and southern New England. This is doubted by some, as large yields have been made at the south. There are, however, great irregularities in the climates within these limits and they correspond in the produce of Indian corn. The temperature extremes sometimes seem to sweep over large tracts of country. In eastern Oregon, valley of the Great Salt Lake, and the upper (but not the lower) valleys of the Grand and Green Rivers, (Colorado of California,) and Rio Grande, it is injured by the daily changes of temperature, though the mean is high enough.

On the coast of the Pacific, west of the coast range mountains, from San Diego to Puget's Sound, nowhere does any month attain a mean temperature of 65°, or permit the ripening of Indian corn. From the sea to that range it is less than 60° mean in July, and where the range is low, this low mean extends inland as far as the principal mountain ranges; but the San Joaquin and the Sacramento valleys are nearly all that have a sufficiently high and equable summer temperature in the middle of the day, which corn indispensably demands for ripening and will not do with any less, unhindered by the daily changes. The cool mornings, evenings, and nights of the east do not affect it, if the midday be very light and beyond the temperature of 65° during its growing and ripening months. In this, corn is not elastic or adaptive.

The northern line of cultivation of Indian corn, then, starting in 64° to 67° of west longitude from Greenwich, at the Bay of Fundy and the valleys of New Brunswick, at the 46th parallel of north latitude, and going west, falls to less than 45° in highlands of Maine, in New Hampshire to 44°, then rises abruptly to

47° at St. Ann's, near Quebec. The mountainous parts of New York, and Canada West between Ottawa River and Lake Huron, can grow no corn; but the river valleys have its line on the 46° of latitude as far west as Lake Huron in 82° west longitude. The elevation of the country and the lakes reduce the temperature and the Indian corn line to 45° of north latitude, and this line continues west almost to the Mississippi; passing this elevated district to the warmer summer of the plains, it goes abruptly north to 50° of north latitude, at Lake Winnipeg, 97° west longitude, which is its highest point, giving on this meridian 23 degrees of latitude in the United States, and the whole amount of 35 degrees of latitude for the North American continent as the range of this single cultivated staple. Westward of this meridian the line becomes irregular and exceptional. On the upper Missouri and to the base of the Rocky Mountains there is some cultivation to 47½° of north latitude. West of the mountains it reappears in the same latitude, and in the lower valleys of the north fork of the Columbia, it goes to Fort Colville, near 49° of north latitude, with a temperature very nearly like Laperai and Fort Vancouver. At 120 its range ceases for all latitudes on the continent of North America. Africa is too tropical and has little place for Indian corn, but near the Mediterranean, in Europe, Spain, a small part of the south of France, say Rochelle, Italy, the valleys of Austria and Hungary and of Turkey, with the islands of the Mediterranean, comprise its range. The high element of greater midday heat for one month of the summer is wanting, and therefore no skill can acclimatize Indian corn for profitable growth in the densely populated parts of Europe, or in the British isles. Corn may be accounted a sure crop in almost every portion of the habitable globe between the 44th parallels of latitude, north and south, with the exceptions named.

The climate is said to be too cool during summer in Oregon for the crop to do well, being like England. In 1857 as far north as Aroostook, Maine, corn silked out at the end of July, and fifty-one bushels of sound corn has been raised; forty is the average, which equals any in the United States returns of 1850. Kämtz limits the growth of Indian corn in Europe, to Rochelle, in France, on the Atlantic coast, and to Strasburg on the Rhine, and they appear to have very nearly the precise

temperature of 65°. On that account it cannot grow in England, in every part of which the mean temperature is only from 55° to 62°. It has too little sun, but two varieties have been said to ripen there in ordinary seasons—the French màis à Poulet, or chicken corn, as used in France, brought from Egypt, which ripens in 120 days from planting, but with too scanty a crop to pay for cultivation. The other, Cobbett's màis quarantain, a forty days' corn, though it takes 140 days to ripen, from Artois, in France. Indian corn will never be cultivated where it does not yield crops which will pay better than the others fitted to the place, the grape, &c., &c. The highest vertical point of cultivation of Indian corn in Europe is at the the village of Lescaus in Basses Pyrenèes, France, 3,280 feet above the sea. In tropical America, at 7,600 feet high. In Beechelbroune, Europe, mean temperature 68° Fahrenheit, Indian corn ripened in four months. In South America it comes to maturity in three months or ninety-two days, the mean temperature 81° and 82° Fahrenheit; but on elevated plains, as Santa Fé, it requires six months or 183 days, with a mean temperature of 59° Fahrenheit, and therefore does not pay.

The southern corn crop of the United States is earlier by one or two months, than Maryland, Virginia, New Jersey, Pennsylvania and New York. Several varieties of maize alter somewhat in size and time of ripening by change of climate. This is imputed to the selection or change of seed. Generally those brought from south to north, after a little while lose any dent, become earlier and the plants diminish in size ; while if they are transferred from a colder to a warmer region the reverse of this takes place. In the colder climate the harder or horny part increases in size and firmness, and the farinaceous or mealy part, diminishes in bulk, but is more compact ; while in warmer climates the kernels become more farinaceous at the expense of the harder part, and the farinaceous portion fills up less perfectly with starch granules and other matter.

No plant will stand the effect of drought so well as Indian corn while it is young ; but when its top blades begin to be heavy, its demands for moisture increase so as to cause it to suffer greatly from very dry weather. The ease and rapidity with which it recovers from a drought is truly remarkable. Many predicted during the summer of 1857 that the corn crop

in Massachusetts would be destroyed. The leaves were badly curled, and there was every indication that the crop would greatly suffer. But it is on record how speedy was its recovery, and how rapid its growth after a change of weather. So great is the dependence upon heat and moisture combined, that, knowing the results of observations of the thermometer and the rain gauge in any section, during the three growing months of April, May and June, one might predict with great certainty the results of the harvest in that section; and, on the other hand, the returns of practical farmers in different sections of the State, indicate so clearly and uniformly the excess above the average, or the partial failure of the crop, that a meteorological map of the State might be constructed from them.

Corn will often succeed well in the Northern States, with a cool, rainy summer, provided there is a week or two of hot weather in the month of June, or early in July, and a late fall with warm weather at the period of ripening. A high, midday heat is so essential, that without it there will be no formation of saccharine matter in the plant, nor will it mature, though with it, the night temperature may be quite low without apparent injury to its growth. This is, therefore, one of the most essential conditions of its successful culture, and this condition is fulfilled in almost every part of the country, except in the mountainous districts already alluded to.

The season of 1858 was remarkable in most parts of New England, as a season of frequent rains and cool weather in July and August, and farmers generally predicted a failure of the corn crop, and wondered all the summer at the luxuriant growth of this plant. The secret of it was, without doubt, that the last week of June and the first week of July were excessively hot, though the rest of the season was unusually cool and moist. The ground had become warmed to a great depth, and this was sufficient to give the plant a rapid growth during the remainder of the growing season.

Nearly every part of the country is, therefore, adapted to the growth of Indian corn, so that, though there are great staples of the Southern States which are more profitable owing to their extremely limited range of climate, yet as a plant for the whole country, there is no other which can compare with it in importance.

The germ or chit is nourished, after the sprouting has commenced, by the starch, sugar, &c., contained in the other parts of the grain, until its roots have so far extended as to secure nourishment from the soil, and the blade shoots up to obtain its nutrition from the air. But if the weather is too cold after the seed is planted, or if the soil is too wet and cold, the main body of the seed or grain is dissolved and rots, so that when the soil and weather become sufficiently warm, the chit may still germinate, but it will find no nutriment in store, when it will wither and die. In such cases the corn must be replanted. The conditions of germination, as already suggested, are heat, moisture, air, and absence of light.

It is plain, therefore, that in a loose, porous, or sandy soil, the seed may be planted deeper than in a stiff soil, where a shallow planting will best secure these conditions of germination.

In the process of growth, the plant takes its food from the air in part, and in part from the soil in solution in water. Corn is said to require the largest proportion of inorganic matter for its thrifty growth about ten or twelve days after it has made its appearance above ground, though not, of course, so large an actual amount as during the subsequent periods of its growth. This amount, doubtless, increases up to the time of ripening. This inorganic matter, taken up by the plant in growth, comes from the soil. It has been estimated that an average acre of the small white flint corn requires and abstracts from the soil no less than 881 pounds of these inorganic substances, of which about 210 pounds are in the form of silica or silicic acid, 94 pounds in the form of phosphate of lime, iron and magnesia, 64 pounds of potash, 63 pounds of soda, 15 pounds of lime, 9 pounds of magnesia, 19 pounds of chlorine, and 30 pounds of sulphuric acid. Most of the other parts of the crop, the organic or combustible matter, are derived from the atmosphere, though some part of it is also derived from the soil.

The crop of white flint corn, on which the estimate stated above was made, took 22,546 pounds of organic matter, consisting of 2,900 pounds of sugar and extract, 5,100 pounds of starch found in the kernel, 15 pounds of rosin found in the cob, 10 pounds of dextrine, 312 pounds of oil, also found in the kernel, 1,150 pounds of fibre, 817 pounds of albumen, 396

pounds of caseine, 143 pounds of zeine, found in the kernel, 171 pounds of wax and chlorophyl, and about 420 pounds of glutinous matter. Of these substances, 8,000 pounds were taken off the farm and sold in the grain, while the bulk of the remainder, 14,500 pounds, was fed out on the farm and returned in the form of manures. Of the inorganic substances, of which there were, as already stated, 881 pounds, about 100 pounds were carried off in the grain, and the remainder, about 781 pounds, consumed on the farm and returned in the manure.

The soil best adapted to the growth and perfection of Indian corn, is a deep, rich, mellow loam. The roots extend to great depths in such soils. A light porous soil is permeable to the heat and air, which contribute to its rapid growth, while a stiff clay or hard soil are unfavorable to it. At the same time it may be said, that this plant has a wonderful degree of flexibility, and easily adapts itself to a great variety of circumstances and soils, so far, at least, as to give remunerative crops, on such as are not in the highest degree favorable to it. Nothing more need be said on this point.

The manures best adapted to it depend somewhat, of course, on the character of the soil to which they are applied, but on an average of the soils of New England, organic manures, such as barnyard dung and muck well decomposed, decayed vegetable matters, &c., may be said to be the best. At the same time it should be stated, that some soils are lacking in a proper amount of phosphates, and these can be supplied in ground bones, ashes, salt, and plaster. On this point, the statements of practical cultivators, given from year to year in my previous Reports, are so full and valuable that it is superfluous to dwell upon it here, and reference is respectfully made to those statements and to the essay on this subject presented in the second part of this Report, page 195. The best modes of preparing the ground by ploughing, &c., will also be found in full from the same sources.

With respect to the selection of seed, after the choice of the variety is determined upon, and this will be governed by local circumstances, the reader is referred to the experiments on a previous page in the report of the committee on the State farm, showing, so far as they go, the relative advantage of using

that taken from the tips, middles, and large ends of the ears, and to the Report of the committee on farms in the second part of my Report of last year, page 150, where a farmer planted only the corn from the small end of the ears, choosing such as were well filled out; then only from the middle of the ears; then only from the big ends. After ten years of trial, he found that in seven years of the ten, the crop from the tips was the the largest and best.

The corn-planter is an invaluable labor-saving machine, and the thrifty farmer who studies economy, will not fail to avail himself of this as well as other improved implements.

With respect to the mode of planting, whether in hills or drills, there is considerable diversity of opinion, but in practice it doubtless depends much on the variety of corn planted. Larger crops can be obtained, I think, in drill planting, especially with the smaller varieties of corn, but there is no question that the labor of cultivation in New England and the older parts of the country is somewhat greater than it would be if planted in hills. Some varieties require greater space than others. On this point, the remarks of Mr. Allen, in an essay on this subject, in the second part, are valuable and to the point.

It is often convenient to know the number of hills and the quantity of seed required on an acre planted at different distances. The following table will be valuable for reference:—

Table of the Number of Hills to the Acre, and the Quarts of Seed required at four and five kernels to the hill.

Distance apart.	Number of Hills.	Quarts at four grains.	Quarts at five grains.
3 feet by $1\frac{2}{3}$ feet, . .	8,712	– –	– –
3 " 2 " . .	7,250	14.52	18.15
3 " $2\frac{1}{2}$ " . .	5,808	– –	– –
3 " 3 " . .	4,840	9.68	12.10
3 " $3\frac{1}{2}$ " . .	3,960	8.30	10.37
$3\frac{1}{2}$ " $3\frac{1}{2}$ " . .	3,554	7.11	8.89
3 " 4 " . .	3,630	7.26	9.08
$3\frac{1}{2}$ " 4 " . .	3,111	6.22	7.78
4 " 4 " . .	2,722	5.44	6.80

Drills 3 feet apart, and 6 stalks 1 inch apart in the drills, will give 29,040 stalks.

Drills 3 feet 9 inches apart, 2 rows in a drill 6 inches apart, and stalks 9 inches apart in the drills, will give 30,970 stalks.

Drills 3 feet apart, 3 rows in a drill 6 inches apart, and stalks 9 inches apart in the drills, will give 43,560 stalks.

Whether planted in hills or drills, it is now pretty well settled among farmers, that it should not be hilled, as was the custom but a few years since. There seem to be several reasons for this. If the earth is drawn up around the stalk at the last hoeing, it sends out new roots which divert much of the nourishment which would otherwise have gone into the stalk and the ear. It is not unfrequently the case that aerial or "prop" roots, even, are emitted from the lower joints of the stem above the ground, and descending, fix themselves in the soil. This takes place on a very much larger scale, if these joints are surrounded with earth. If the earth is taken from the intermediate spaces, so as to leave hollows, the long branching roots become exposed to the sun, and cause the plant to feel the drought too severely.

A level surface on a cornfield does not wash so badly as an uneven one. The custom of hilling corn was derived from the Indians, who planted it so, and even occupied the same hills or mounds year after year successively, raising three clusters of stalks on each large hill, and scraping fresh soil upon them, so that they remain to our day. The similar cultivation now even sometimes followed, is called planting in Indian hills.

For fodder, corn is usually sown in drills by hand at the rate of about three bushels an acre. Forty stalks to a foot, it is said, will produce one-third more than twenty stalks to a foot, in furrows wide enough apart for a one-horse cultivator to go through once, as it should do, when the corn is a foot high.

The practice of raising corn to cut and feed out green by way of partial soiling, is very common. This culture has been carried still farther by many farmers, and many acres are raised in various parts of the State of Massachusetts for the purpose of cutting and curing for winter use.

The common practice with regard to this crop, is to sow in drills from two and a half to three feet apart, on land well tilled and thoroughly manured, making the drills from six to ten

inches wide, with the plough, manuring in the furrow, dropping the corn about two inches apart, and covering with the hoe. In this mode of culture the cultivator may be used between the rows when the corn is from six to twelve inches high, and unless the ground is very weedy no other after culture is generally needed. The first sowing usually takes place about the 20th of May, and this is succeeded by other sowings at intervals of a week or ten days, till July, in order to have a succession of green fodder. But if it is designed to cut it up to cure for winter use, an early sowing is generally preferred, in order to be able to cure it in warm weather, in August or early in September. Sown in this way, about three or four bushels of corn are required for an acre, since if sown thickly, the fodder is better, the stalks smaller, and the waste less.

The chief difficulty in curing corn cultivated for this purpose and after the methods spoken of, arises mainly from the fact that it comes at a season when the weather is often colder, the days shorter, and the dews heavier than when the curing of hay takes place. Nor is the curing of corn, cut up green, so easy and simple as that of drying the stalks of Indian corn cut above the ear, as in our common practice of topping, since then the plant is riper, less juicy, and cures more readily. The method sometimes adopted is to cut and tie into small bundles, after it is somewhat wilted, and stook upon the ground, where it is allowed to stand, subject to all the changes of the weather, with only the protection of the stook itself. The stooks consist of bunches of stalks first bound in small bundles, and are made sufficiently large to prevent the wind from blowing them over. The arms are thrown around the tops to bring them together as closely as possible, when the tops are broken over or twisted together, or otherwise fastened in order to make the stook "shed the rain" as well as possible. In this condition they stand out till sufficiently dried to put into the barn.

But Indian corn stooked in this way often becomes musty or covered with dust, while the rains often soak it thoroughly and wash out much of its soluble matter, and its nutritive value is in a great measure lost. Besides, every one knows that to cut up a green plant, as a willow or any other thriftily growing plant or shrub, and set it up with the cut end resting upon the ground where it can still derive moisture from the soil, will

prevent its drying. There can be no doubt, also, that the exposure to the sun, wind and rain, greatly injures it by removing much of its sweetness, or changing it to woody fibre, while it takes from it its beautiful fresh green color.

To avoid the losses necessarily attending these modes of curing, some have suggested kiln drying as far preferable, and on the whole, as economical. I have known the experiment tried in one or two instances with complete success, the fodder coming out with its fresh green color, and apparently better relished by cattle than that dried in the ordinary way. This method appears to me to be worthy of much more extended and careful experiment. The kiln need not be elaborately or expensively contrived. The process of drying would be short and the labor light.

Another mode which has been suggested is to hang it up in sheds open to the air, precisely as tobacco is cured in the western part of the State. This process would be longer, but the nutritive qualities of the plant would probably be better preserved than if cured in the open air with the exposure to the frequent changes of the weather. It is hardly necessary to say that if it is proposed to cure in this way, it should be hung up thinly and the air should be allowed to circulate through it. After being well dried it is taken down and stowed away in the barn for use. This method avoids the trouble of stooking and the liability to injury from rains and dews, which blacken the stalks, though it requires considerable room, and is, of course, attended with some additional labor.

The modes of cultivating Indian corn as a field crop are too familiar to need explanation. The yield will generally be in proportion to the thoroughness of the tillage. It is enough to say, that the ground, after being properly ploughed and planted, should be hoed and stirred often enough, at least, to keep it free from weeds, and to refer the reader again to the full and detailed statements of practical farmers which have appeared in the annual reports. It was not my purpose to repeat what I considered well said and sufficiently settled in the more recent reports, but only to call attention to those points which had not been touched upon to any extent, either in the statements of practical cultivators or in the reports of committees of agricultural societies. Nor would it be proper to designate in this

connection the particular machines which I thought, on the whole, the most valuable for use in the various processes of cultivating and harvesting the crop. The comparative merits of each are within the easy reach of every intelligent farmer, and he can avail himself of them with all the light of the experience of farmers, as given in the transactions of the societies from year to year.

After it is harvested and husked, it will usually shrink more or less, depending upon the degree of ripeness it has attained, and the variety. The shrinkage is often as great as 25 per cent., and even more.

On this point, the careful statements of the supervisor of the Plymouth County Agricultural Society, Mr. E. P. Howland, are full and valuable. He says:—

"From each of the seven acres, I harvested two rods in October, selecting, as near as we could judge, average rods, or as good as the fields would average.

"This corn I took home with me, spread it separately on high scaffolds in my barn, where it had a good circulation of air through two open windows, and I shelled, weighed and measured it, on the first week of January, 1859, with the following results:—

Table of Weight of Two Rods, kept by the Supervisor.

	Oct. 1858.	Jan. 1859.	Shelled.	Shrinkage.	Shrink.
	lbs.	lbs.	lbs.	lbs.	per cent.
Robert Perkins, . . .	118¼	92	77	26¼	22.20
George W. Wood, . .	128¼	95½	78	32¾	25.53
James Howard, . . .	100	77	65	23	23.
Friend W. Howland, .	97	75	62¼	22	22.60
Nathan Whitman, . .	96	74½	59½	21½	22.40
Jona. Copeland, . .	90	71½	57½	18½	20.
Nahum Snell, . . .	88	67½	55⅜	20½	23.20

Table of Weight of Whole Acre, including the two rods.

	Oct. 1858.	Jan. 1859.	Shelled.	Shrinkage.	Shrink.	Bushels meas'rd.	Bush. of 56 lbs.
	lbs.	lbs.	lbs.	lbs.	per ct.		
R. Perkins, .	8,518	6,827½	5,716	1,690½	19.84	103½	102
G. W. Wood, .	6,998¾	5,601½	4,588	1,397¼	19.96	90½	81 44/56
Jas. Howard, .	6,356	5,175⅜	4,364	1,180⅝	18.57	–	77 53/56
Nahum Snell,	6,303	5,074	3,822⅓	1,229	19.49	65½	68 15/56
J. Copeland, .	5,585	4,353½	3,635	1,231½	22.50	62¾	64 51/56

"Calling 56 pounds of shelled corn a bushel, the greatest amount was 102 bushels, by Robert Perkins, of Bridgewater; the next was that of George W. Wood, of Middleborough, 81 44/56 bushels; the next James Howard, of West Bridgewater, 77 52/56 bushels.

"The other competitors for this premium raised corn of excellent quality, mostly yellow, and very heavy: weighing 58 pounds and upwards per bushel, as commonly measured.

"Mr. F. W. Howland, of South Hanson, had a very fine field of corn, a part of which was white, and a part yellow. The land was an old bushy pasture. It was cleared and planted, and attended with much labor and care, and had he been permitted to harvest it, he would doubtless have given us an accurate and interesting statement of his proceedings and success. But some of the corn having been stolen from the field a short time before harvest, it was impossible for him to give an accurate statement of the full amount of the crop. The corn, however, that was saved, was shelled and weighed in January. It weighed about 60 pounds per bushel.

"A few days in the month of October greatly varies the weight of a field of corn. The shrinkage on the corn which I took home from the 6th to the 9th of October, was found to be from 20 to 25½ per cent. when weighed in the first week of January; while the corn which remained in the field from five to ten days later, shrank from 18½ to 22½ per cent. between the time of harvest and January, making, on an average, about three per cent. difference.

The five lots of corn in the foregoing table, together weighing in January 27,032 pounds, and yielding 395 bushels of 56 pounds each, required on an average 68.43 pounds of ears for one bushel of shelled corn.

Now if we estimate 85 pounds of ears at harvest to yield 56 pounds of shelled corn, and the shrinkage is upon an average 23 per cent., we have heretofore committed an important error in acknowledging 85 pounds for a bushel of the specimen rod. For although 85 pounds of ears at the time the farmer gathers in a field of maize may on an average give 56 pounds of shelled corn, yet the supervisor usually selects his rod or two rods several days before the rest of the field is harvested, and in those intervening days the ripening corn will shrink from two to five per cent.

"Take Mr. G. W. Wood's corn for example. The two rods which I harvested October 7th, shrank 25½ per cent., while the rest of the field, harvested about the last of October, shrank only 19.96 per cent., making more than 5½ per cent. difference. This corn was rather green at the time of harvest, and being on low ground, did not ripen so fast as it would on higher and warmer land.

With Mr. James Howard's corn the case was different. His two rods, gathered October 6th, were riper and on higher land. This shrank in weight 23 per cent., while the whole acre harvested some ten days later, (being in such a state of forwardness that the ripening process was more rapid,) arrived to such a state of dryness, during the intervening ten days, that it shrank in weight only 18.57 per cent. to the first of January; thus making a difference of nearly 4½ per cent. in the shrinkage between the specimen rods and the whole acre.

"Thus you may perceive that the difficulties are numerous and various in obtaining an exact estimate of an acre of corn, from the weight of a single rod taken from the field even but a few days before the whole is harvested.

"But with all these difficulties so various and so numerous, the experiments which have been made under the offer of this premium, have shown us to a demonstration that more than one hundred bushels of good sound corn can be raised on one acre of land in Plymouth county; also, that 85 pounds of ears at the time corn is usually harvested, will yield a bushel or 56 pounds

of shelled corn, and yet if we take 85 pounds of ears from different fields, of different varieties of corn, and different degrees of ripeness consequent upon the varieties of soil, the modes of culture, the kinds and application of manure, several days or weeks before the whole field is in a suitable state of ripeness to put away in the cribs, 85 pounds of ears would not be sufficient to allow for a bushel; and I know not what number of pounds could be adopted as a uniform standard; and to make an allowance in weight where corn is dry,—and very dry,—damp, and very green,—would be as uncertain a method of computation as resorting to guess work.

"Let us take the weight of George W. Wood's acre at the time of harvest, 6,998.75 pounds, and divide it by 85 pounds, and we have 82.33 as the number of bushels of 56 pounds each on the acre; which differs but a small fraction from the amount actually weighed and measured. Now suppose we estimate the specimen rods, to learn how many pounds of ears were needed for a bushel of shelled corn, and we have the following answer:—78:128.5::56:92.9; thus—if 78 pounds of shelled corn required 128.5 pounds of ears, 56 pounds of shelled corn will require 92.9 pounds, or nearly eight pounds more than the standard, 85.

"Now if we had, in this case, estimated the whole acre from the specimen rods, and reckoned 85 pounds of ears for a bushel, we should have called the product 120 bushels; whereas it was only about 82, a little more than two-thirds of what we should erroneously have supposed. How many such estimates have been made in years past, it is not easy to determine.

"So of Mr. Perkins' corn. Divide the whole weight at the time of harvest, 8,518 pounds by 85, and we have a quotient of 100, and 18 remainder, coming within two bushels of the actual measurement. But had we estimated the whole field from the specimen rods, when taken, we should have reckoned nine bushels too much. And yet this corn would from the specimen rods, have required 86 pounds of ears for a bushel of shelled corn. For 77:118.25::56.86."

Two bushels of ears will almost invariably make one of shelled corn, and some varieties have been known to give a bushel of shelled corn to a bushel and a half of ears.

Corn is usually measured and sold in New England by the bushel of fifty-six pounds, though at the south it is most commonly spoken of and sold in barrels of five bushels.

The imperial bushel now used in the United States, contains 80 pounds of water, or 2,218.192 cubic inches of capacity. The old Winchester bushel formerly used in England and this country, was of 2,150.42 cubic inches capacity. A bushel of Indian corn in Massachusetts weighs 56 pounds statute weight. The legal weight of a bushel in England is 60 pounds. In Vermont, New York and Delaware, the legal weight is 56 pounds. The weight of corn and other grains is regulated by the laws of the several States. The imperial measurement is adopted by the United States, and applies to the whole country, and standard or uniform weights and measures furnished by the government to all the States.

It may be proper in this connection to state the results of some experiments in the raising of corn at the State Farm, at Westborough. In the year 1856 there were planted there over thirty-five acres, beside a considerable amount of sweet and fodder corn.

The yield was 2,940 bushels of ears, estimated at 1,470 bushels of shelled corn, an average of 42 bushels per acre.

Experiments in Manuring Corn Lands—Fertilizers all spread and ploughed in.

No.		Acres.	Cost of Manures.	Total Bush.	Sound Corn.	Soft Corn.	Weight of Stover.
1.	Barn compost, 8⅓ cords, .	1	$25 00	100	94	6	3,205
2.	Guano, ...	1	15 00	88	68	20	2,010
3.	Potash, dissolved and mixed with coal ashes, . .	1	15 00	73	68	5	1,885
4.	Mapes' super-phosphate, .	1	15 00	44	26	18	1,585
5.	De Burg's super-phosphate,	1	15 00	57	43	14	1,565
6.	Barn compost, $7; Gould's muriate of lime, $8, .	1	15 00	82	75	7	2,190
7.	Liquid manure from reservoir, at cost of carrying out—2 acres, av. per acre,	1	5 00	88	82	6	Not weigh'd

The first six acres, in the order of numbering, had been planted three years in succession with corn, and manured with the same kind of fertilizers, except No. 3, which was guanoed in the hill. In 1854–5 the fertilizers were used in the hill, but in 1856 mixed with moist loam and sown broadcast in damp weather and covered with the harrow.

The corn came up well and grew thriftily until the first of August, when an unfavorable change became apparent. On No. 1, the ears were large, long and sound. Upon 2, 3, 4, 5, the corn was not so good. No. 6, was sound and handsome, but not equal to No. 1.

No. 7 was manured with two dressings, one before ploughing, of 45 loads of 326 gallons per acre, and the other of 30 loads at the time of the second hoeing. Until August, the corn looked very inferior. It then put on a thrifty appearance.

Again, two acres were manured with barn-cellar compost, 8⅓ cords per acre, spread and ploughed in. The yield was 77 bushels of ears per acre. This piece of land had been planted six years with corn. For the above named crop it was manured with a compost of swamp muck, cornstalks and waste, with lime, which will account for its deficiency.

Two other acres were manured also with 8⅓ cords of barn cellar compost, and 150 pounds of guano per acre, and produced 146 bushels of ears per acre. The corn was large and sound.

Another two acre lot was manured with 8⅓ cords of barn cellar manure per acre; yield, 123 bushels of ears per acre. These last lots had been planted to corn three years in succession, and 8⅓ cords of barn cellar manure were applied per acre each year, spread and ploughed in, with the exception of one, which received $6 worth of barn cellar manure and 300 pounds of super-phosphate of lime. The field of fourteen acres was ploughed nine inches deep, planted in hills three feet by two and a half apart, May 28 and 29, with "smutty white," or Plymouth corn, thoroughly hoed three times, harvested and measured with results as stated.

Five acres, after having produced a crop of rye the year previous was manured with stable compost and guano, and produced 36 bushels of ears of corn per acre. The land is inferior in quality, not easy of access, and has, therefore, been lightly manured in former years.

Another lot of three acres, had, hitherto, been lightly manured. Ten cords of reservoir compost were applied, and it was planted with Connecticut River corn, and produced 210 bushels of long, full ears of corn.

Three and a fourth acres of land manured with $8\frac{1}{3}$ cords of best barn cellar compost per acre, spread and ploughed in, and planted May 23 with King Philip corn, yielded 273 bushels of ears of corn, or 84 bushels of ears per acre. The stalks were small and the corn ripened early.

Another lot of seven acres of old pasture was manured with 300 pounds of guano per acre, planted May 20 and 21 with Brigham corn and produced 607 bushels of ears of corn, or $86\frac{5}{7}$ bushels of ears per acre, manure never having been applied to this land.

Two acres manured with piggery compost, $6\frac{2}{3}$ cords per acre, spread, ploughed in, all furrowed three feet apart one way, and one acre four feet apart the other way; the other, eighteen inches. On the former acre five stalks stood in a hill, and the other, three. Both were planted the same day, one with a hoe and the other with Randall's corn planter; both hoed three times. The corn was all good; that produced on that part of the field planted four feet apart one way was better filled and every way superior to the other.

Of the thirty-five acres of corn, twenty-four were cut up and stooked, eleven topped; and in every lot, says the farmer, the corn was better with the former mode of harvesting than the latter.

The corn was all measured in the ear.

The following statements exhibit the results produced by the application of the various fertilizers to the same land, on the corn crops, for the years 1854 and 1855.

Corn on the Plain, six lots of one acre each.

No.	Bush. of ears per acre.
1. Reservoir manure, ...	87
2. and 3. Guano, ...	72
4. Mapes' super-phosphate, ...	85
5. De Burg's super-phosphate, ...	101
6. Bones, ground, ...	90
Expense of fertilizers per acre, 1854, ...	$10 00

No.		Bush. of ears per acre.
1.	Stable compost,	99
2.	Guano, (corn did not come up well,)	59
3.	Potash,	70
4.	Mapes' super-phosphate,	86
5.	De Burg's super-phosphate,	72½
6.	Muriate of lime,	65

Expense of fertilizers per acre, 1855, ... $12 00

Synopsis of the three years, in their order, giving the number of bushels of ears of corn per year.

No.		1854.	1855.	1856.
1.	Stable compost,	87	99	100
2.	Guano,	72	59	88
3.	Guano,	72	70*	73*
4.	Mapes' super-phosphate,	85	86	44
5.	De Burg's super-phosphate,	101	72½	57
6.	Bones, ground,	90	65†	88‡

* Potash. † Muriate of Lime. ‡ Manure and Muriate of Lime.

In relation to the fertilizers used for corn, stable manures have been and will continue to be appropriate. Guano mixed with these and ploughed in before heating, has proved beneficial, by giving an excess of 23 bushels of ears of corn for 150 pounds of guano as seen in the experiments above. The application of guano to the old pasture, which had never been manured, as seen, produced exceedingly good results, as in the seven acres of the Brigham lot, and would seem to warrant its application by farmers to such land, as a very cheap fertilizer, if $9 worth per acre, as in this case, produces 87 bushels of ears of corn per acre.

With respect to the uses of Indian corn and Indian meal, a volume might be written. I do not propose to enter very minutely into detail on this part of the subject.

Count Rumford maintained that practically Indian corn was next to wheat the most nutritive of the grains. It is more

stimulating than any other kind of bread used by us. Its fattening qualities are great. If less nutritive than wheat its bulk is scarcely less important than its nutritive qualities. The average price of wheat has sometimes ranged as high as two and a half dollars, when that of Indian corn was at one dollar. If prices were based on actual nutritive value, we should get less than half the nutriment in the wheat, that we should get in corn of the same money value.

Oily corn makes a dry bread and is not so adhesive. Rye is generally mixed with it. The southern and Oregon corn contain a large percentage of starch, and are therefore preferred by some for bread making. 150 pounds of corn it has been found in France, make from 215 to 223 pounds of bread. Experiments there show that the yellow corn is dryer and harder and resists moisture better than the white, giving less bran and more meal by about one-twentieth. Here, fourteen pounds of good corn meal make about ninety pounds of mush, so thick as not to run.

If ground too fine, Indian meal is liable to suffer injury from exposure to the air. The difference in meal depends a good deal on the miller and the mills. Some samples are soft, others sharp and gritty, the effect not so much of fine or coarse grinding as of other causes, as the manner in which the mill stones are dressed, &c. So that the quality of bread made from Indian corn will depend much on the manner in which it is ground.

Common brown bread, or what is often called Boston brown bread, contains ordinarily two parts of corn to one of rye meal by measurement. To three quarts of this mixed meal a gill of molasses is added, two teaspoonfuls of salt, one teaspoonful of saleratus and a teacupful of home-brewed or a half teacupful of brewer's yeast. An article known as maizena, manufactured at Glen Cove, Long Island, of white southern corn, and put up in pound packages of snowy whiteness, is said by some to be equal to the best Bermuda arrow root for blanc-mange, minute puddings, &c., &c.

Large quantities of early sweet corn are scalded when green, separated from the cob, and kiln dried for winter use. It may be preserved, as it often is, in its green state, by hermetically sealing in cans.

When ripe, the grain is often hulled by means of a weak ley, or in a machine made for the purpose, then boiled and eaten as hulled corn or samp. Hominy is corn broken or coarsely ground with the hulls blown off when it is boiled in water.

Southern hominy is of two kinds, large and small; the first is beaten in a wooden mortar a foot deep and twelve to fourteen inches wide; the last is ground in a corn mill. One or two quarts of white flint corn are put in the mortar and a little boiling water poured on occasionally, to keep it moist and cause the skins to slip off the corn and prevent the flinty portion from being beaten into meal. During the beating, remove the whole contents into a tray and toss in a current of air, to fan out meal and bran; beat till every grain is broken and skinned. If not used soon after it is beaten, it should be carefully dried, or it will be likely to sour. Small hominy is the same corn a little moistened, and then ground like corn meal, except raising the stone about three times higher, so as to crush the grain to about the size of wheat (small wheat); this is in general use at the south and called "grits." It is cooked thus: sift the flour from the grits, scour it to get off the hulls, put two quarts of water to one of grits; boil till the water is all absorbed, cover the pot and set it on hot ashes to soak for fifteen or twenty minutes, not forgetting to season with salt. Large hominy is cooked similarly, but before being taken up should be well mashed against the sides of the pot; a half a pint of white beans added to a quart of hominy is considered an improvement. If seasoned with lard, put it in before taking off the fire; butter can be put in at any time. Preserve the corn white, and never use mixed corn in making hominy.

The details of cooking the infinite variety of delicious dishes which may be made of good Indian corn meal, are already too familiar, perhaps, to need repetition, but as an example, a few of these recipes may be stated as follows:—

Hasty Pudding.—The simplest and most common way of cooking corn meal, is to put two quarts of water into a clean pot or sauce-pan, set it over the fire, adding a teaspoonful of salt, and when it begins to boil, stir in a lump of fresh butter, say about two ounces, then add (a handful at a time) sufficient Indian meal to make it very thick, stirring it all the time with a mush-stick. Keep it boiling well, and continue to throw in meal till it is so thick that the stick or paddle stands upright in

it. Then send it to table hot, and eat it with milk, cream, or molasses and butter. What is left may be cut into slices and fried for breakfast next day.

PLAIN JOHNNY-CAKE.—Sift a quart of Indian meal into a pan, make a hole in the middle and pour into it a pint of warm water, adding a teaspoonful of salt; with a spoon mix the meal and water gradually into a soft dough, stir it very hard for a quarter of an hour or more, till it becomes light and spongy, then spread the dough smooth and evenly on a stout, flat board, a piece of the head of a flour barrel will serve for this purpose, place the board nearly, but not quite upright, and set a smoothing iron or a stone against the back to support it; bake it well; when done, cut it into squares, and send it hot to table, split and butter; some prefer sirup or molasses with it.

NICE JOHNNY-CAKE.—Sift a quart of Indian meal into a pan, rub two table-spoonfuls of butter into it, add a small teacup of molasses, and a teaspoonful of ground ginger, and pour on by degrees sufficient warm water to make a moderately soft dough; it may be stirred very hard; then grease with fresh butter, small tin pans about $2\frac{1}{2}$ inches in diameter and $\frac{3}{4}$ of an inch deep, fill them with the dough and bake with a strong fire. They must be well baked, taking care that the surface does not burn while the inside is soft and raw.

HOE-CAKE.—Take an earthen or tin pan and half fill it with coarse Indian meal, which should be sifted in, adding a little salt; have ready a kettle of boiling water, pour into the Indian meal sufficient hot water (a little at a time) to make a stiff dough, stirring it with a spoon as you proceed. It must be thoroughly mixed and stirred hard. If you want the cakes for breakfast, mix this dough over night; cover the pan and set it in a cool place till morning; if kept warm it may turn sour. Early next morning as soon as the fire is burning well, set the griddle over it and take out the dough a handful at a time; flatten and shape it by patting with your hands till you form it into cakes about the size of a common saucer and half an inch thick; when the griddle is quite hot lay on as many cakes as it will hold and bake them brown; when the upper side is done slip a knife beneath and turn them over; they must be baked brown on both sides. Eat them warm with butter, molasses, or whatever suits best. They will be less liable to stick if before each baking the griddle should be greased with a bit of fat pork or butter.

Indian Mush.—Have ready on a clear fire a pot of boiling water, stir into it by degrees (a handful at a time) sufficient Indian meal to make a very thick porridge, and then add a very small portion of salt, allowing not more than a teaspoonful to a quart of meal; the pot must be kept boiling all the time you are stirring in the meal, and between every handful stir hard with the mush-stick, (a round stick about half a yard long, flattened at the lower end like a paddle,) as if not well stirred the mush will be lumpy; after it is sufficiently thick and smooth keep it boiling an hour longer, stirring it occasionally; then cover the pot and set it where it will simmer slowly for another hour. The goodness and wholesomeness of mush depends greatly on its being long and thoroughly boiled. It should also be made very thick. If well made and well cooked it is wholesome and nutritious, but the contrary if thin and not sufficiently boiled. Send it to the table hot and in a deep dish; eat it with sweet milk or cream, or with butter and sugar, or with butter and molasses. When cold it may be cut into slices and fried in butter or lard.

Indian meal Gruel.—This is an excellent food for the sick. Having sifted some Indian meal, mix in a quart bowl three table-spoonfuls of the meal with six of cold water; stir it smooth and press out the lumps against the side of the bowl; have ready a clean saucepan entirely free from grease, with a pint of boiling water; pour this scalding hot on the mixture in the bowl, a little at a time and stir it well, adding a pinch of salt; then put the whole back into the saucepan, set it on hot coals and stir it well till it boils, making the spoon go down to the bottom to prevent the gruel from burning; after it has come to a boil let it continue boiling half an hour, stirring it frequently and skimming it. Give it to the invalid warm in a bowl or tumbler, to be eaten with a spoon; it may be sweetened with a little sugar, and when the physician permits, some grated nutmeg may be added, also a very little wine.

Corn Bread.—Rub a piece of butter the size of an egg into a pint of corn meal, make it a batter with two eggs, and some new milk and a spoonful of yeast, set it by the fire an hour to rise; butter little pans as above, and bake in an oven with a quick heat. Or—

Take three quarts of milk, if a little sour all the better, seven eggs, two ounces of butter, one teaspoonful of saleratus, and mix with corn meal to the consistency of a thick batter, and bake with a brisk heat.

Corn Batter Bread.—Take six table-spoonfuls of flour and three of corn meal, with a little salt, sift them and make a thin batter with

four eggs and a sufficient quantity of milk, bake in small pans in a quick oven.

Superior Breakfast Corn Cakes.—Take three teacupfuls of corn meal, one cup of wheat flour, two of milk and one of cream, (or in the absence of cream a little butter,) one egg, one teaspoonful of salt; bake in small pans as above with a brisk heat.

Corn Meal Breakfast Cakes.—Mix over night a quart of Indian meal, a teacupful of wheat flour, a table-spoonful of salt, a quart of warm water; pour on gradually the warm water, and stir it in with a large spoon, so as to form a very soft dough, cover the pan and set it by until morning. In the morning thin the dough with another pint of warm water so as to make it into a batter, having first dissolved in the water a salt-spoonful of saleratus or a bit the size of a hazlenut; beat the mixture hard, then cover it and let it stand near the fire for a quarter of an hour before you begin to bake it. Bake it in thin cakes on a griddle, send them to table hot, and eat them with butter and molasses or honey.

Missouri Corn Cakes.—Sift three pints of corn meal into a pan, add a teaspoonful of salt, a table-spoonful of lard or nice drippings of roast beef, a teaspoonful of soda in a little warm water, make it into a soft dough with a pint of cold water, then thin it to the consistency of a moderate batter by adding gradually not quite a pint and a half of warm water; when it is all mixed beat or stir it well for half an hour, then have the griddle over the fire, and when hot grease it with beef suet or a piece of salt pork. Put on the batter and bake quick; send them hot to table as fast as baked; eat them with butter, &c.

These cakes are excellent and very convenient, as they require neither eggs, milk or yeast. They may be baked as soon as mixed, or they may stand an hour or more.

Indian Corn Biscuit.—Sift a quart of corn meal and a pint of wheat flour into a pan with a teaspoonful of salt and three pints of milk, mix them well, beat the whites of four eggs and the yolks separately in two pans; the yolks must be beat until very thick and smooth, the whites to a stiff froth that will stand alone by itself, then stir the yolks a little at a time into the milk; butter a sufficient number of cups or small deep pans, nearly fill them with the batter, set them immediately into a hot oven and bake them fast; turn them out of the cups and send them warm to the table, pull them open and eat them with butter. They will puff up finely if at the last you stir in a teaspoonful of soda, dissolved in a little warm water.

Boiled Corn Pudding.—Mix one quart of corn meal with three quarts of milk, take care it is not lumpy, add three eggs and one gill of molasses. It must be put on the fire at an early hour to eat at dinner. The great secret of this pudding is tying the bag properly as the meal swells very much.

Farmers' Corn Pudding.—Set on the fire a large pot of water which must boil hard by the time the pudding is mixed. Put one quart of milk by itself into a saucepan and give it a boil; when it has come to a boil, pour it into a deep pan and stir into it a pint of molasses, then add by degrees three pints of Indian meal, and lastly a teaspoonful of ground cinnamon or ginger; have ready a pudding bag, dip it into boiling water, shake it out, then pour the batter into a bag, tie firmly, leaving about one-third vacant as it requires room to swell; put the bag into the large pot of boiling water, cover it closely, and let it boil steadily for at least three hours, four will not be too long. While boiling it should be turned frequently; as the water boils away, replenish it with more water kept boiling for this purpose in another kettle; on no account put in cold water as that will render the pudding heavy. Turn it out of the bag immediately before it goes to the table, and eat with butter and molasses. It will be found excellent.

Boiled Indian Pudding.—Three pints of corn meal, half a pound of beef suet minced as fine as possible, a quart of milk, half a pint of molasses, six eggs, three or four sticks of cinnamon broken small, a grated nutmeg. Having cleaned the suet from the skin and strings, chop it as fine as possible and mix it with the corn meal; boil the cinnamon in the milk till it is highly flavored, then strain the milk boiling hot into the pan of corn meal and suet, and add the molasses; stir the mixture very hard, cover it and set it away in a cool place; beat the eggs till quite light and add them gradually to the mixture as soon as it is quite cold, then grate in the nutmegs. Dip a thick square cloth into boiling water, shake it out, dredge it with flour, and then spread it open in a deep pan and pour in the mixture, leaving one-third of the space vacant allowing for the pudding to swell, tie the cloth very securely and to guard against the water getting into it, plug up the little cracks at the tying place by plastering on a bit of dough made of flour and water. Put the pudding into a large pot of boiling water, (having an old plate at the bottom,) and boil it six hours turning it often, and replenishing the pot when necessary with boiling water from another kettle. Serve it hot; eat with wine-sauce, with butter and molasses, or with a sauce of butter, sugar, lemon juice and nutmeg, beaten together to a cream.

Baked Cron Meal Pudding.—One pint of corn meal, half a pint of molasses, a quarter of a pound of butter, a pint of milk, four eggs, the rind of a large lemon grated, or teaspoonful of powdered cinnamon and nutmeg mixed. Boil the milk, sift the meal into an earthen pan, pour the milk over it and stir them well together; cut up the butter into a small saucepan, pour the molasses over it, set it on the fire and let them warm together till the butter is soft, but not oiled; stir them well, and mix them with milk and corn meal, set the pan in a cool place; in a separate pan, beat the eggs very light, and when the mixture has become cold, add the eggs to it gradually, then stir in the spice and grated lemon-peel, stir the whole very hard; put the mixture in a buttered dish and bake it well; serve it up hot, and eat it with a sauce made of powdered white sugar and butter, seasoned with nutmeg and lemon or orange juice, and stirred together to a cream, or with a liquid sauce of melted butter, wine and nutmeg. This quantity of ingredients will make a small pudding; for a larger one, allow a double portion of each article, and bake it well.

Corn Cup Cakes.—One and a half pints of yellow corn meal, half a pint of wheat flour, one and a half pints of sour milk, (buttermilk is best,) a small teaspoonful of saleratus, or soda, dissolved in warm water, two eggs, and a teaspoonful of salt. Sift the corn meal and wheat flour into a pan, and mix them well, adding the salt; if you have no buttermilk, or other sour milk at hand, turn some sweet milk sour by setting a pan of it in the sun, or stir in a spoonful of vinegar; take out a small cupful of the sour milk, and reserve it to be put in at the last; beat the eggs very light, and then stir them gradually into the milk, alternately with the meal, a little at a time of each; lastly, dissolve the soda or saleratus, and stir it into the cup of sour milk that has been reserved for the purpose; it will effervesce; stir it into the mixture while foaming, which should be a thick batter; have ready some teacups, or little deep tins, butter them well, nearly fill them with the batter, and set them immediately into a rather brisk oven. The cakes must be thoroughly baked all through; when done turn them out on large plates, and send them hot to the table.

Corn Crumpets.—One quart of corn meal, half a pint of wheat flour, one quart of milk, one teaspoonful of salt, three eggs, two large tablespoonfuls of fresh yeast. Warm the milk, sift the corn meal and the flour into a pan and mix them well, then stir them into the milk a handful at a time, adding the salt; beat the eggs very light in another pan, and stir them gradually into the milk and meal, add the yeast and stir the whole well, then cover it and set it to rise in a warm place; when it

has become very light and is covered with bubbles, have the griddle ready heated to begin to bake the cakes, first greasing the griddle. For each crumpet pour on a large ladle full of batter; send them to the table as hot as possible; eat with butter to which molasses or honey may be added.

If the batter should chance to become sour by standing too long it may be remedied by stirring in a teaspoonful of soda or saleratus dissolved in a little lukewarm water; then bake it.

Baked Corn Pudding.—To one teacupful of corn meal add one quart of milk, three eggs and a little ginger. Bake one hour.

Rye and Indian Griddle Cakes.—Take one cupful of corn meal, two cups of rye flour, one egg, a little salt, and three spoonfuls of soda and cream of tartar, one of soda and two of tartar, make a batter the same as for buckwheat cakes and bake on a griddle.

Rye and Indian Bread.—Take three pints of rye flour, one tablespoonful of salt, four teaspoonfuls of soda and cream of tartar as above, one teacupful of molasses, one quart of boiling water, the whole to be mixed and thinned sufficiently with sweet milk.

Hominy is prepared by grinding or cracking white corn in a mill or mortar, then it is sized with riddles or seives of various sizes, and the hulls or chaff blown off. There are generally three sizes, big, middling and small hominy.

One quart of small hominy will absorb about two quarts of water; the same quantity of meal will absorb about five pints of water. The coarser the hominy the longer it will require to boil it.

It should be boiled in the following manner. Wash in two or three waters, taking care each time to let them settle; when the water is first put on it should be well rubbed with the hands, in order to separate the husks or skins and flour if any arise, then put it in a sauce-pan with two quarts of soft water, slightly salted, (one teaspoonful to the quart,) and let it boil slowly two hours or more, occasionally stirring it as soon as it begins to boil to prevent its burning. It may be boiled to any consistency that may be preferred, from that of mush to the dryness of rice, the latter is generally preferred. If any should be left from dinner, add a little hot milk or water, and one egg, and flour enough to give it consistency; bake on a griddle and you have a dish not inferior to that of rice.

Hominy Breakfast Cakes.—Boil two cups of small hominy very soft, add an equal quantity of white corn meal, with a little salt, and a

large table-spoonful of butter, make it into a thin batter with three eggs and a sufficient quantity of milk, beat them all together some time, and bake them on a griddle, or in waffle irons. When eggs are dear or scarce yeast makes a good substitute; put a spoonful into the batter and let it stand an hour to rise.

Hominy Dessert Pudding.—Wash a pint of small hominy very clean and boil it tender, add an equal quantity of corn meal, make into a batter with eggs, milk and a piece of butter; bake it like batter cakes on a griddle, and eat with butter, sugar or sirup: some prefer wheat flour instead of the meal.

Hominy Bread.—Break two eggs into a bowl and beat them from ten to twelve minutes; add, by continually stirring, a teaspoonful of fine salt, four or five table-spoonfuls of hot hominy, rendered nearly to the consistency of thick gruel with hot milk, one large spoonful of butter, and a pint of scalded meal squeezed dry. Make up the mixture into small loaves or rural cakes one and a half inches thick, and bake in a quick oven.

Hominy Pudding.—Boil half a pound of fine hominy in milk, add three-quarters of a pound of sugar, and the same of butter, half a nutmeg, six eggs, a gill of wine and a little grated lemon peel. Bake in a dish.

Samp is corn hulled and broken into quarters either in a mortar or in a mill for the purpose. It is perfectly white, being made from pure white corn. It is sometimes divested of its outer skin by scalding in a white ley, and then dried, broken and winnowed. Having washed it through two or three waters pour boiling water on it, cover it and let it soak all night or for several hours, then put it into a sauce-pan, allow two quarts of water to each quart of hominy and boil it till perfectly soft, then drain it, put into a deep dish, add some butter to it and send it to table hot, (and uncovered,) to eat with any sort of meat, but particularly with corn beef and pork. Many use it for a vegetable instead of potatoes. If any should be left it may be made the next day into thin cakes and fried in butter. To be very good, hominy should be boiled four or five hours.

To Boil Indian Corn.—Corn for boiling should be full grown but young and tender and the grains soft and milky; if its grains are becoming hard and yellow it is too old for boiling. Strip the ears of their leaves and husks and the silk; it is best to leave one thickness of the

husks on the ear, it keeps it hot longer and adds sweetness; put them into a large kettle of boiling water and boil it rather fast for half an hour or more, in proportion to its size and age. When done take it up, drain it, dish it under a cover or napkin, and send it hot. Before eating it rub each ear with salt and pepper and then spread it with butter. Epicures in corn consider it sweetest when eaten off the cob; and so it is, but before company few persons like to hold an ear of Indian corn in their hands and bite the grains off with their teeth; therefore it is more frequently cut off the cob into a dish, mixed with salt, pepper and butter, and helped with a spoon.

Green Corn Cakes.—Mix one pint of grated green corn with three table-spoonfuls of milk, one teacup of flour, half a teacup of melted butter, one egg, a teaspoonful of salt, and a half a teaspoonful of pepper; drop this mixture into hot butter by the spoonful, let the cakes fry eight or ten minutes. These cakes are nice served up with meats for dinner.

Green Corn Dumplings.—One quart of young corn, grated from the cob; half a pint of wheat flower sifted, half a pint of milk; six table-spoonfuls of butter; two eggs, a salt-spoonful of salt, the same of pepper; butter for frying.

Having grated as fine as possible sufficient young corn to make a quart, mix with it the wheat flour, and add the salt and pepper. Warm the milk in a small sauce-pan and soften the butter in it. Then add them gradually to the pan of corn, stirring very hard, and set it away to cool. Beat the eggs light and stir them into the mixture, when it has cooled. Flour your hands and make it into little dumplings. Put into a frying pan a sufficiency of butter, (or lard and butter, in equal proportions,) and when it is boiling hot and has been skimmed, put in the dumplings, and fry them ten minutes or more in proportion to their thickness. Then drain them and send them hot to the dinner table.

Green Corn Porridge.—Take young corn and cut the grains from the cob; measure it, and to each heaping pint of corn, allow not quite a quart of milk. Put the corn and milk into a pot, stir them well together, and boil them till the corn is perfectly soft; then add some bits of butter, dredged with flour, and let it boil five minutes longer; stir in at the last, some butter, yolk of an egg, and in three minutes remove it from the fire. Take up the porridge and send it to table hot, and stir some fresh butter into it; sugar and nutmeg may be added if desirable.

Corn Oysters.—Three dozen ears of large, young corn, six eggs, lard and butter, in equal portions for frying. The corn must be young

and soft; grate it from the cob, as fine as possible, and dredge it with wheat flour. Beat very light the six eggs, and mix them gradually with the corn; then let the whole be well incorporated by hand beating, add a salt-spoonful of salt; have ready in a frying pan a sufficient quantity of lard and butter, mixed together; set it over the fire, till it is boiling hot, and then put in portions of the corn mixture, so as to form oval cakes, about three inches long and nearly one inch thick. Fry them brown and send them to table hot. In taste they will be found to have singular resemblance to fried oysters, and are universally liked, if properly done. They make nice side dishes at dinner, and are very good at breakfast.

Corn Starch Pudding.—Corn starch is now extensively manufactured at Oswego, N. Y., and for culinary purposes exceeds any other yet made. It is now extensively used throughout the United States.

To make a nice delicate pudding, to one quart of boiling milk add one teacupful of starch, one teaspoonful of salt, and three well beaten eggs; as soon as the milk boils, take it off, add first the starch, then the eggs; the starch to be mixed as for clothes. To be eaten with fruit, or a rich sauce; cream and loaf sugar beaten together, with a little wine, make an excellent sauce.

This is a very convenient dessert when a family is taken by surprise in having friends unexpectedly to dine, as it can be made after meats are served. By baking, it makes a delicate baked pudding.

Minute Pudding.—To six table-spoonfuls of starch dissolved, add three eggs; beat them thoroughly together; one quart of milk, a little salted, and when heated nearly to boiling, pour in the mixture of starch and eggs; stir briskly until it boils three minutes, and it is ready for use. Flavor with lemon, vanilla, or to your taste. For sauce, cream and loaf sugar beaten together, with or without brandy, or any other which may be preferred.

Baked Corn Starch Pudding.—Six table-spoonfuls of starch, to one quart of milk, a little salted; dissolve the starch in a part of the milk; heat the remainder of the milk to nearly boiling, then add the dissolved starch; boil three minutes, stirring it briskly; allow it to cool; add three eggs and sugar; flavor to your taste, and bake half an hour.

Corn Starch Blanc Mange.—To one quart of boiling milk, add two table-spoonfuls of starch, thoroughly mixed with a little milk, and

three eggs, well beaten; boil all together until sufficiently thick, stirring it constantly; sweeten and flavor to your taste; then turn it into moulds to cool.

Summer Succotash.—String two quarts of young green beans, and cut them into small pieces, half an inch long, and do not split them; have by you a pan of cold water, and throw the beans into it as you cut them; have ready, over the fire, a pot or sauce-pan of boiling water: put in the beans and boil them hard near twenty minutes; afterwards take them up and drain them well through a cullender. Take six ears of young corn, full grown, (or eight or nine if they are not all large,) and cut the grains down from the cob; mix together the corn and the beans, adding a very small teaspoonful of salt, and boil them twenty minutes; then take up the succotash, drain it well through a seive, put into a deep dish, and while hot, mix in a lump of butter the size of an egg, add some pepper, and send it to table. It is generally eaten with salted or smoked meat.

Winter Succotash.—This is made of dried shelled beans and hard corn. Take equal quantities of shelled beans and corn, put them over night into separate pans and pour boiling water over them: let them soak till morning, then pour off the water and scald them again. First boil the beans by themselves, and when they are soft add the corn, and let them boil together till the corn is quite soft, which will require at least one hour; take them up, drain them in a seive, then put them into a deep dish, and mix in a large piece of fresh butter and a little pepper and salt. This is an excellent accompaniment to pickled pork, bacon, or corned beef. The meat must be boiled by itself in a separate pot.

To preserve Corn for Cooking.—Take corn when it is young and tender, and barely full grown, let it remain on the cob till it has been boiled from ten to fifteen minutes (not over) in a large pot of slightly salted water, that must be boiling hard when the corn is put in. When thus parboiled, take it out; and when cool enough to handle, cut down the grains from the cob into a deep pan with a knife; then spread out the grains in large flat dishes or shallow pans, and set them in an oven after the bread, pies, &c., are done, and have been taken out: let corn remain in the oven till it is all well dried; if the oven is heated every day, the corn may be put in a second time; when quite dry, and after it has cooled, put it into a large thick bag, tie the bag tightly, and hang it up in a cool dry room; when wanted for use, corn thus prepared will be found excellent for boiling in winter soup, or boiled by itself and drained, and sent to table in a vegetable dish to eat with meat, first

mixing with it some butter and a little pepper and salt. It will boil as soft and taste as well as when fresh from the garden. It will be better for soaking all night in water before cooking.

It is well known that the stalks of Indian corn, as they begin to turn color in ripening, contain from ten to fifteen per cent. of sugar in the juice, especially if the ears are plucked off as soon as they form. This juice may be expressed precisely as that of the sugar cane, and treated in the same way, but it has not been found practicable to use it for this purpose in countries where the sugar cane can be grown. During the Revolutionary War it was very common to make molasses from Indian corn, though it was liable to sour. The molasses made from it has a corn stalk flavor, but this does not appear in the sugar. It does not granulate as readily as the juice of the sugar cane.

Enormous quantities of our best grains are now annually withdrawn from their legitimate uses as food for man and beast, for the purpose of making alcoholic liquors of them. Many distilleries consume more than 2,000 bushels of Indian corn or other grains, a day, on an average, so that the consumption of corn in this way is very great. Cincinnati is the greatest whiskey market, and the Ohio Valley the most important whiskey producing region in the world. One distillery in Cincinnati consumes 1,000 bushels of Indian corn alone, making from it 4,000 gallons per day, or about 1,248,000 gallons a year from 312,000 bushels of corn. It is ascertained, that the quantity of whiskey annually sold in the above-named city, is 220,000 barrels, or 9,000,000 of gallons, and this is only about one-half of the production of Ohio and Indiana. The yield of those two States alone, for 1858, was about 18,000,000 gallons therefore, and the consumption of Indian corn 12,500,000 bushels, and the money value of the product was $5,000,000. This business is rapidly increasing. It is said that as much whiskey can be made from the cobs of corn, weight for weight, as from potatoes.

The quantity of spirits which Indian corn yields depends chiefly upon the proportion of starch which it contains, and the small quantity of uncrystallizable sugar in it. One hundred pounds of corn yield a spirit containing 45 per cent. of absolute alcohol. In the manufacture of whiskey the corn oil is sep-

arated, and rises during the fermentation, and is used for burning and other purposes, 15 or 16 gallons of oil rising, it is said, from every 100 bushels of corn.

Starch is also extensively manufactured in this country from Indian corn. The importation of starch into the United States in 1857, amounted to only 118,838 pounds, valued at $6,695. Most of this, or 51,000 pounds, came from Scotland, 44,000 from Holland, 14,000 pounds from England, and the remainder from Mexico, Cuba, France, Canada and China.

A patent was issued in England in the year 1855, for the use of finely ground and bolted Indian meal for sizing, stiffening and finishing textile fabrics, such as cotton and linen goods. This is a substitution of corn for wheat flour for these purposes.

The husks of corn are soaked in warm water, and then twisted and plaited into durable and serviceable house mats. They are also extensively used for making mattresses, being split for this purpose like straw for braiding. The finer they are split the softer they are.

A beautiful writing paper has been made of corn husks in Italy. A greyish paper can be made from all parts of the plant. Cobbett published a book printed on paper made from Indian corn.

A good purple dye is sometimes made from the purple varieties of corn.

But it is as a food for fattening cattle, swine and poultry, that Indian corn rises to paramount importance as a cultivated crop. The flavor of corn-fed beef and pork is better than that of any other, and the flesh has greater solidity and substance, while in France it is thought, and not without reason, that poultry fed and fattened on it acquire a high flavored flesh, like that of the English pheasant, and that their eggs are of a superior color and flavor.

Nor is it less important for feeding to stock of other kinds, and for other purposes than fattening, as for dairy cows, &c., and, for the raising of young stock, well-cured corn fodder is not only one of the healthiest, but in every other respect, one of the most economical articles of food.

Indian corn began to be imported more extensively into England in 1843, in which year it received 81,000 bushels, but in 1854 there were imported into Great Britain 10,797,584 bushels

of corn and 6,143,856 pounds of Indian meal. The export of this crop from the United States has steadily increased since 1821, when the value was $619,279. In 1847 it amounted to $18,696,546. This was the year of the famine in Ireland, but in 1849 the export of corn amounted to no less than 13,257,309 bushels, valued at $7,966,369; and in 1855, corn and its manufactures were shipped from this country to the extent of $8,198,693.

It may remarked, in concluding this special subject, that cotton is sometimes said to be king; but if in the agriculture of this country, the genius of which is eminently republican, where all the great staples form so important a part in promoting the national prosperity, one can be said to hold preëminence over the rest, the palm must be yielded to the golden corn, rearing its "imperial form and tasselled banner" high over all its compeers, and founding its claim to royalty as the prince of cereals, by the universality of its uses, and its intrinsic importance to mankind.

THE STATE CABINET

Connected with the office has rapidly increased during the past year, and has even now become an object of attraction to a large number of visitors.

Of the different departments designed to illustrate the natural history of the State, that of geology and mineralogy is most complete. It has been rearranged, and a full catalogue will be found in the Appendix.

In the department of ornithology, the donations during the past year have been extensive and valuable, and the special acknowledgments of the Board are due to Prof. J. W. P. Jenks, and to Mr. Francis E. Everett for extensive contributions, and for the preparation of many specimens donated by others. A full catalogue of the birds will also be found in the Appendix, together with the names of donors. The collection now embraces about two-thirds of all the different species of birds in the State, and it is hoped that the public spirit of individuals in all parts of the Commonwealth will aid in completing this most interesting collection.

The department of entomology has grown up entirely within the past year, and the specimens of insects now number nearly

two thousand species, for the most part, collected, prepared and presented by Mr. F. G. Sanborn. A full catalogue of this collection will also be found in the Appendix.

A collection of the shells of the State has been placed on deposit in the museum by Mr. Samuel Tufts, Jr., a catalogue of which will be found in the Appendix. I acknowledge, also, the donation of forty-four species of shells from Mr. William Stimpson, received too late to be included in the catalogue above named.

In the department of botany the collection is numerous and valuable, embracing several hundred species of grasses and other plants, including a very valuable collection placed on deposit by Dr. Edward Jarvis, and another by Dr. Charles Pickering. Owing to the extreme pressure of official duties, and the lateness of the season when these last contributions were made, it has not been possible to arrange and catalogue this department in season for the present Report, and the publication of a catalogue is reluctantly deferred till another year.

In the department of icthyology the donations have been extensive, and a catalogue of most of the fresh-water fishes of Massachusetts will be found in the Appendix. A large number of the salt-water fishes have been presented by Capt. N. E. Atwood. The catalogue of these is deferred till another year in the hope of being able to present it then nearly complete, embracing all the species found in our waters.

Among the miscellaneous specimens donated by various individuals, acknowledgments are due to Hon. B. V. French, for specimens of Indian axes; to Mr. James Crafts, for samples of drain tile, manufactured at Whately; to Mrs. Ashby, of Newburyport, for specimens of quaking grass and rough and polished serpentine; to Rev. Mr. Syle, missionary in China, for models of Chinese farming implements; to Mr. Joseph Warren, of Chelmsford, for specimens of old farming implements used in that town at the time of its early settlement; to Mr. James Hall, for specimens of relics of the house of Captain Miles Standish at Duxbury; to Mr. G. P. Sargent, for a collection of grains and plants of Switzerland, the two-headed snake of Newbury, specimens of crystallized quartz, polished agate from Mount Saint Gothard, Indian bark cloth, &c.; to Mr. W. H. Floyd, of Weston, for jars of reptiles; to

Messrs. Curtis & Cobb, for specimens of California wheat, and the wood, cone, and branch of *sequoia gigantea*, of California; to John Brooks, Jr., Esq., for samples of wood from thirteen different States; to J. H. Carey, for skin pouch prepared by the Indians, and cane brake from the Mississippi River; to Charles K. Willis, for four specimens of Indian arrow heads; to H. B. Bishop, for skin of a rattlesnake killed in Texas; to Mr. Cunningham, for prepared strawberries from Valparaiso.

It is the design to make a complete collection illustrating the natural history of the State, and the aid of all public spirited individuals is solicited in building up a State Cabinet which shall do honor to the Commonwealth, and be a means of increasing the public taste for these fascinating pursuits.

The study of natural history, whether followed as an occupation or as an amusement, does much to cultivate that gentleness, refinement and virtue of character which is the fittest ornament of every age and condition of life. It is not only an important branch of knowledge in itself, but it opens the door to many other branches of knowledge, and no education ought to be considered as at all complete that does not furnish the means of careful and intelligent observation of the works and mysteries of nature to every diligent student. Especially is a knowledge of the natural history of one's own region and of the objects with which he comes in frequent contact, important and useful, even in a practical point of view, to every member of the community. It is desirable also to make a collection which will illustrate the past and present condition of the agriculture of the Commonwealth, and relics of the implements used at a former period of our history should be studiously collected and preserved, since the time will soon come when it will be wholly impossible to make such a collection. It is eminently proper, therefore, that the State should undertake to do what individuals have neglected, and show to the eye of every beholder, far better than any language can express, what progress has actually been made in the practical arts of life.

The past year has been one of more than usual prosperity with most of the agricultural societies of the State. The exhibitions drew together large bodies of people, and the county fairs all over the State may be regarded as the great festivals

in their respective localities. The financial condition of each society will be seen in the Appendix, to which reference is respectfully made.

The spirit of inquiry leading to farm improvements of various kinds, was never so general, the reading of agricultural papers, books and journals never so universal, the establishment of farmers' clubs never so frequent, as at the present time ; and though these are in themselves objects of the highest importance to the prosperity of the community, yet the practical results to which they must inevitably lead are even more encouraging, since they are not only conducing to the well-being of the present generation, but laying the foundation for the increased happiness and prosperity of millions who will come after us.

CHARLES L. FLINT,

Secretary of the State Board of Agriculture.

BOSTON, Jan. 26, 1859.

REPORTS OF COMMITTEES

APPOINTED TO VISIT THE

AGRICULTURAL EXHIBITIONS.

15*

ESSEX.

Having been appointed by the Board to attend the annual exhibition of the Essex Agricultural Society holden on the 29th and 30th of September last, I attended to that duty, and submit the following Report:—

After having spent a very pleasant night in sharing the hospitality of General William Sutton, of South Danvers, and enjoyed a stroll over his grounds and among his buildings and stock, and finding every thing in the very best order, in company with him on the morning of the 30th, I rode over to Danvers where the exhibition was being held. The weather was very pleasant, and we were greeted on our way with abundant evidences of thrift and—onions; the former a legitimate result of the cultivation of the latter. On arriving in the vicinity of the exhibition, I was much gratified to notice the large crowd of visitors with which the whole neighborhood was thronged. It seemed as though the people had turned out en masse to celebrate the holiday. This is right. These occasions should be considered what they certainly deserve to be, the great festive gatherings of the year. The husbandman, relying upon the promise that seed-time and harvest shall not fail, has deposited his seed in the earth in full confidence, and watched and tended it with perhaps the same faith, but not always without some grumblings and complaints concerning the heat, the cold, the wet, or the drought, at last sees his crops arrive at full fruition, putting to flight his doubts, making him ashamed of any distrust which he may have indulged, and filling his heart with gratitude and thankfulness. Whose breast does not swell with emotion as he looks upon the noble specimens of the varied products of the soil which are displayed at these exhibitions? Here are to be seen the various elements of the staff of life; luscious and tempting fruits; the products of the vegetable garden; the fragrant flower. The necessaries and the luxuries of life; the useful and the beautiful. In the department allotted to animals we find the noble horse; the patient ox; the useful sheep and

the hoggish swine, all living for the benefit of man, and finally, man himself, the most wonderful of all, and for whom all the others seem to have been created, subject to his dominion. It is pleasant to know that the people appreciate these things and give their attendance and influence for the promotion of the agricultural interest; an interest which lies at the foundation of all prosperity, and is essential even to the continuance of life itself.

I first visited that part of the exhibition which was within doors. I found a display of fruits that for quality is seldom equalled. Very large and perfect specimens of apples and pears in particular, proved that horticultural skill was by no means wanting in Essex County. I was however somewhat disappointed in the comparatively small number of dishes of fruit presented. Upon inquiry I learned that premiums were only offered for certain varieties and that all others were excluded. This course has been adopted for the purpose of keeping out a flood of ordinary and inferior varieties which would otherwise crowd the tables. Although this course may result in producing a more select and acceptable show for the consideration of the amateur, yet it seems to me that to ignore the existence of a class of fruits because they do not reach a certain arbitrary and fallible standard of excellence, is not calculated to bring about the end sought for in the most speedy manner. It is only by directly comparing the good with the bad that the superior qualities of the one and the imperfections of the other are brought out and made manifest to the looker on. In the list of varieties admitted I noticed some important omissions of generally acknowledged superior fruits. Among the cut flowers, a fine collection of dahlias numbering, as was stated to me, upwards of 150 varieties from a single contributor, attracted much attention.

In the vegetable department the specimens were of superior excellence; but here again I noticed that the collection as a whole was rather a small one, though not from the same cause as before referred to. There seemed to be no reason, so far as I could learn, why the large number of celebrated vegetable growers of the vicinity should not have contributed more freely. In many of the articles there were but one and two contributors, hardly enough to excite a competition. The mechanical

interest, as I have generally noticed at agricultural exhibitions, was but meagrely represented.

My time being somewhat limited, I hurried to the stock department. Here I found an almost interminable line of pens, filled with representatives of the various classes of animals. I saw no very fat cattle but there were fine-conditioned working oxen. Of the breeds of neat stock, the Alderney and Ayrshire, seemed to predominate, although there was quite an infusion of some of the other prominent breeds. I had no time to criticize individuals, but feel constrained to say that a finer looking stock of cattle, with no inferior animals, is but seldom collected together. There were quite a number of very promising horses, and some no doubt that could perform, inasmuch as one gentleman of considerable note was ready to bet that one of them would do incredible things. That however was not in the programme, and so he saved his reputation and his money. There was a good collection of sheep and swine, and also of poultry, but I was obliged to leave for the ploughing match.

The ploughing came off with reasonable promptness,—the crowd being obliged to wait only a half or three-fourths an hour,—and showed some very good work. The field was an easy one for the purpose. I noticed the usual fault of unnatural speed, notwithstanding, according to the rules of the society, it detracts from the merit of the competitor. There was one land ploughed by a pair of horses that as far as beauty goes was the perfection of ploughing. There was literally scarcely a blade of grass to be seen upon the whole piece ploughed. This bespeaks rare excellence in the workman, the team and the plough.

After the ploughing match a procession was formed and marched to the church, where an hour was profitably spent in listening to a finely written and delivered address by Dr. George B. Loring, of Salem, upon the duties of the farmer; commencing with a beautiful tribute to the memory of the late Colonel Moses Newell, who at the time of his death was a member of this Board from the Essex Society. My own acquaintance with Colonel Newell, although of comparatively brief duration, had made so strong an impression upon me, that I felt his absence from the exhibition of the Essex Society with sorrow, and I was

prepared fully to respond to all that was so feelingly and so well said by the orator.

At the close of the address the procession re-formed and marched to the dinner table spread under a large tent, which was crowded with people, drawn together to listen to the magic eloquence of the Hon. Edward Everett. After the edibles had been dispatched, the retiring president of the society, Hon. R. S. Fay, very gracefully introduced Mr. Everett, who charmed the listeners with a sketch of the progress of the age during the twenty-two years since he had appeared before them in the character of an orator. A few short speeches from others followed, after which the new president, Colonel Daniel Adams, assumed the chair, and the reading of the awards of premiums by the various committees closed the day's proceedings.

JABEZ FISHER.

MIDDLESEX.

I was delegated by the Board of Agriculture to attend the annual exhibition and cattle show of the Middlesex County Agricultural Society, held at Concord on the 29th day of September, 1858 ; and I attended accordingly. I viewed the grounds of the society, and the exhibition in their hall, attended the annual dinner and also the annual business meeting. Without proceeding to consider in detail the various portions of the exhibition and show, I desire, very briefly, to give my impressions in regard to the principal features of the occasion.

I was more gratified with the promptness with which each separate portion of the duties and pleasures of the day was entered upon, than with any other thing. The arrangements had been well made, and they were carried out with an exactness and precision that added much to their effect. I have never seen the excellence of method so well displayed on any like occasion. It may be inferred from this that the officers of the society are efficient and dutiful ; and such is the fact. And they have also, I am happy to say, the confidence of the mem-

bers, and the relations between them appear to be harmonious in every respect.

The anniversary appeared also to have that popular appreciation which is necessary to success. The business meeting was well attended, and its work was done carefully and thoroughly.

The grounds and hall are much too small for the purposes which they are designed to subserve. The exhibition was necessarily, therefore, crowded, and for that reason, less satisfactory. The display of stock was not so well appreciated, for a like cause. The trial of horses was within so small a space as to impair, to a very great degree, its interest and value. The material of the exhibition, however,—the cattle, horses, swine, implements, vegetables, fruits, and domestic manufactures,—gave great satisfaction to your delegate.

The dinner, which is one of the most attractive facts of the annual shows, and one to which the farmers and their families look forward with deep interest, was unusually interesting. The address was given at the tables by Ralph Waldo Emerson, and his well established reputation as a writer and thinker was fully sustained in the department of agricultural philosophy. The discourse will undoubtedly be published. Other addresses were made by the venerable Joseph T. Buckingham, for many years president of the society, by Hon. Joseph Howe, of Halifax, N. S., E. P. Whipple, Esq., and others.

On the whole the day was one of pleasure and profit. My report to the Board is, in short, that the affairs of the society are in the hands of officers who understand their duties, and are conscientious in the discharge of them; that the farmers of Middlesex are deeply interested in the subject of agricultural education, experiment and progress; and that the aid given this society by the Commonwealth is well applied, and expended according to the intent of the laws of the State.

GEORGE MARSTON.

MIDDLESEX NORTH.

Agreeably to my appointment as delegate from the Massachusetts State Board of Agriculture, I attended their annual exhibition at Lowell on the fifteenth day of September. The day was pleasant, but the streets of the city quite dry and dusty.

The first business of the day was the ploughing match, where thirteen teams contended, doing the work generally well. Seven of them were awarded prizes.

The stock in the pens appeared tolerably well, and some choice specimens, but quite a number of ordinary animals, hardly a fair specimen of what this section of the county might show.

The number of swine exhibited was quite small, but of good quality and well selected. Still more attention might be profitably bestowed on this animal by our farmers, and stock raised to take the place in our markets now occupied by the sickly, still-fed, alligator breeds.

A few hogs of the right kind may be raised by every farmer, yielding as much profit as any other stock on the farm, as well enriching the land, as disposing of noxious weeds working over manure, &c., &c.

Would it not be well for some of our laboring classes, who keep one or two useless curs annoying the traveller, and a nuisance to the town, to figure up the relative cost of keeping a dog and hog, and see which is worth and which produces most, at the end of the year. This, if correctly done, would in many cases, I think, place the pigsty in place of the dog-kennel.

The number of horses exhibited was quite large. Many valuable animals were on the ground, the two following days being set apart to display them; unfortunately the weather, part of the time, was stormy, still a large sum of money was received.

Few specimens of butter were exhibited, and but one cheese; more attention should be bestowed on the dairy, by our farmers' wives and daughters.

Nearly fifty loaves of bread were on the tables, very much to

the credit of the fair hands who made them. No article of domestic manufacture is better appreciated, than good, light, well-made bread; no article of diet contributes to home comfort more.

The display of vegetables was quite large, and many fine specimens adorned the hall.

Much credit is due to Mr. Lorenzo Phelps, who contributed forty-seven varieties, as part of the production of the Lowell city poor farm, also grapes and fine melons. The example of this city in this particular is highly commendable, and worthy the imitation of every city and town in the State having a farm connected with their poor-houses.

The fruit offered was excellent, particularly pears, showing high cultivation. The specimens of Bartlett pears I never have seen equalled. Of needle work and fancy articles there was a good display, and highly creditable to the ladies producing them.

On the whole, the show passed off well, and much credit is due to the officers of the society for their exertions in the cause of agriculture.

WM. G. LEWIS.

MIDDLESEX SOUTH.

The undersigned, delegated by the Massachusetts State Board of Agriculture to visit the South Middlesex Agricultural Society, respectfully reports, that unavoidable circumstances prevented his being present on that occasion. He has the pleasure, however, to state, through the medium of a competent eye witness, that the exhibition was one which conferred much honor on the officers and members of the society.

The Middlesex South Agricultural Society, although one of the younger members of the agricultural family, is still one of the most enterprising and flourishing in the Commonwealth. This society have erected a building 58 by 90 feet, consisting of a light, airy basement, exhibition room, assembly room, and suitable offices, and the past year this has been completed.

The exhibition was held at Framingham, on the society's grounds, on the 22d day of September. The day was warm and pleasant, and the various committees attended with punctuality, to the duties with which they were charged. Eighteen teams competed at the ploughing match. This was contested with commendable spirit and ability. The work for the most part was well executed, and the trial presented one of the most interesting spectacles of the day. The exhibition of neat cattle was remarkable, not only for the large number of animals brought out, but for its general value and excellence. That of horses, swine and fowls, was satisfactory. Of fruits and vegetables, the quantity shown was large and of improved character. In these there was manifest evidences of careful and successful cultivation.

The grounds were crowded with visitors, not less than 6,000 or 8,000 being present on the two days, and it may safely be asserted, that the interest and emulation which exists in the association, will work out great good to the farmers of this district.

The annual address was delivered by ex-governor Emory Washburn. It was eloquent and instructive, and the speeches of the other guests present were of the appropriate stamp for the farmers' holiday.

On the whole, it was considered by those qualified to judge, that the exhibition was equal in merit and usefulness to any which the society ever held, and gave also encouraging signs of a still brighter future.

MARSHALL P. WILDER.

WORCESTER.

At the request of the Board of Agriculture, I had the honor, as their delegate, to attend the fortieth annual exhibition of the Worcester Agricultural Society, on the sixth day of October last, at the city of Worcester. It gave me great pleasure on that occasion to know that the mantle of honor which had so long been borne by those of the name of Lincoln in their connection with that society, was still so worthily and nobly worn

by the son of an honored father, as presiding officer of the society, by whom, and by all his associates in the direction of the society, I was received as your delegate with much courtesy and hospitality. It speaks well for the stability and firmness of the society, that in a period so remarkable as the present for frequent official changes, this should be the case. It is however to be regretted that somewhat of its pristine influence and power has been taken from this society by the formation of three other agricultural societies within its original limits, which has tended to detract from the legitimate interest of its annual exhibitions. There seems to be a peculiar fitness and propriety in having all within the territorial limits of a county united in one county society. The presence of farmers from all parts of the county, at these annual reunions, has a strong influence in producing a harmony of feeling between the residents of the different sections of the county; it enlarges the field of competition in the various departments where premiums are offered, and elevates the standard of excellence by requiring more of skill, industry and energy to obtain the highest premiums, and this too, at less cost to the Commonwealth, than under a system of undue multiplication of smaller societies.

I think that the awards made at this exhibition amounted to about one thousand dollars, and all other expenses of the society about five hundred dollars, making an aggregate expenditure of about fifteen hundred dollars. I was pleased to learn that the society are fixed in their determination to incur no additional debt, and to limit their future expenditures to their income, a salutary principle which should be adopted by every agricultural society, and which is as essential to the prosperity of a society as to that of individuals. "Pay as you go," is indeed a good motto for all. It is therefore to be regretted that the society are still laboring under a debt incurred for the purchase of their spacious grounds, and the erection of their exhibition hall; and it is to be hoped that ere long some munificent member of the society will relieve them from the burden of the annual payment of interest.

As Worcester is one of the most noted dairy districts of the Commonwealth, I was somewhat surprised at the preponderance of the amount paid for premiums connected with the exhibition of horses, above that paid for premiums for the best

neat cattle, which seemed to evince a disproportionate interest in behalf of the horse department of the show.

There were present so many of the intelligent farmers of the county, either of whom could have added much to the interest of the occasion by a detail of the results of his experience, that I regretted that the usual agricultural address, which in other counties is delivered on such festivals, was omitted on this occasion. I have derived so much pleasure and benefit from the addresses to which in years past I have listened at our county exhibitions, that I should be extremely unwilling to dispense with this part of the programme at our annual reunions.

Notwithstanding all the disadvantages under which the society labored, the exhibition was eminently successful, and in the opinion of those well qualified to judge, by a comparison of the present with the past, surpassed any ever held by the society, as at present constituted, in the number and excellence of the animals offered for premiums, in the variety, ingenuity and skill of the mechanical implements and manufactured articles exhibited.

This is as it should be, and it must afford much gratification and encouragement to the officers of the society, to know that their unwearied efforts to promote the prosperity of the agricultural interests of the heart of the Commonwealth, are crowned with such success. As I was not present on the second day of the show, which was, I understood, to be devoted mainly to the exhibition of horses, to the trial of their speed and other points which seemed to me not strictly within the province of our society, and which I should fear would tend to divert the attention of members from the legitimate objects of that society, I am unable to furnish any account of the results of that part of the exhibition.

William Sutton.

WORCESTER WEST.

As the representative of the State Board of Agriculture, I attended the eighth annual exhibition of the Worcester West Agricultural Society, at Barre, held on the 30th of September. It was evident that the society has the ability to make one of the best shows in the State, but being held but one day, it was impossible for your delegate to make as thorough an examination of the several departments as he could have desired.

In stock, grade Durhams preponderate; in fact, there were few other cattle—and from the full-grown, fat and working oxen, the beef cow, or in milk, steers and heifers, to the weaned or sucking calf, it may well be doubted whether any society can match this with cattle of their own raising.

For a considerable period the farmers in this section have been breeding grade Durhams, procuring occasionally a new thorough-bred bull, and perhaps for all purposes where the farms produce so abundantly the best of grass and hay, and where work, beef and the dairy so equally share their attention, they have occasion to be satisfied with the result.

Though Mr. John Sanderson of Franklin County took the first two premiums for fat oxen, there seemed no just ground of complaint, as he had the enterprise to extend his landed possessions into an adjoining county.

The sheep, swine and poultry, I had no opportunity to see.

The ploughing match was contested by ten teams, and though the sward was underlaid with stone, the ploughmen, (mostly owners of the teams,) showed by the complete manner of turning the furrow, that they were familiar with that description of land. Some of the teams at the drawing match hauled and backed a cart load of stone to greater perfection than is often witnessed, with little or no whipping. There appeared to be a good understanding between the owner and the oxen.

The exhibition of horses on the common, was excellent, and conducted with the utmost propriety. There were some superior animals.

My opportunities were too limited to do more than to glance at the numerous products of the dairy, the field, and the gar-

den, in the hall. Of the cheese all that need be said is, that it was made by the dairywomen of Barre and the surrounding towns.

The numerous articles of household manufacture and fancy work were highly creditable to the ladies.

The annual agricultural fair is pre-eminently the farmers' holiday, for which he has been preparing and looking forward to with great interest. And sufficient time should be taken to make it in the highest degree useful to the community. But how can its full benefit be realized by any one, when the time for examining the various kinds of stock, attending the ploughing, drawing, and horse show—dinner, address, and reports of committees, are all crowded into the brief space of time between ten and three o'clock. It should be borne in mind, too, that a large proportion of the most valuable members of the society are nearly all the time on duty as members of committees. Two days, in the opinion of your delegate, is not too much time for a fair, where so good an exhibition can be made as "Worcester West;" and the cost and trouble is too great, and the compensation too small when confined to one.

The address by Mr. Secretary Flint on subjects connected with the dairy, was appropriate to the location and the occasion.

L. Sweetser.

WORCESTER NORTH.

Owing to the inability of Mr. Field to fulfil his appointment as delegate from the State Board, at his request I attended as his substitute.

The weather was exceedingly unpropitious, the heavy rolling clouds early commencing to drop their moisture; notwithstanding which, however, there was a large gathering early in the morning, of the people of Worcester North.

The president of that society, Dr. Fisher, is one who in theoretical and practical agriculture leads, making his theoretical skill subservient to his practical operations, and more than any man is developing the agricultural resources of his locality.

Our steps were first directed through the rain to the grounds upon which was the stock and the ploughing match. The greatest number of cattle from any one town, was from Princeton, and Mr. John Brooks, Jr., the largest contributor. His milch cows were very fine, indeed the general show of cows was exceedingly good; superior heifers and heifer calves were exhibited by him, by Messrs. Boyles and Watson, all of Princeton.

There were thirty-two bulls of all kinds and grades. The Devon blood seems to be getting largely introduced, and for working oxen they have no superiors. Messrs. Brooks and Caswell exhibited two fine Devon bulls, that would show to advantage anywhere. There were also grades of Hereford, Ayrshire and Jersey, with one or two fine Durhams. Twelve head of fat cattle, most of which were about right to begin to fat, as we count fatness. Twelve pairs of good working oxen, some of which were superior.

The ploughing match was spiritedly contested by six double and two single teams of oxen and four of horses and one of mules. The land was such as to test the skill and patience of the ploughmen, a thin, gravelly soil, filled with stones. The work was, however, well done and in a short time; the single teams in twenty-six and twenty-eight minutes, double teams from thirteen to twenty-six, and the horse teams from nineteen to thirty-three. The double Michigan plough was as usual a great favorite. Rich's cast iron beam plough, manufactured at Westborough, did its work admirably and with apparent ease.

The drawing match attracted a crowd. A pair of Devon steers only two years old and perfect in their build and action drew a ton without urging, up quite a hill. They are beauties and belong to Reed of Princeton. A pair of mules of Dr. Fisher, weighing only 1,360 pounds, pulled a load of over 2,500 pounds on a drag, up a hard hill.

We believe that mules ought to be worked in very many places where horses are now used. Less expensive in the first cost, muscular, cordy, tough, they are easier kept, and will out-live and out-work horses by a large per cent.; and if mules are properly brought up, cared for, and treated kindly, there need be no complaint of viciousness. We hope the example of Dr. Fisher in working mules will be followed.

The show of horses was very good, though the rain prevented such an examination as would have been pleasant. There were nearly a hundred swine, some of which were very superior; some Suffolks would compare favorably with those of any section.

Of that most profitable animal, the sheep, the entries were not so numerous as we would have liked, and of those exhibited we observed no pure bloods of any kind.

We believe there is no branch of farming more profitable than that of raising sheep for mutton and lambs; taking the middle-woolled sheep and making the wool a secondary article, there is no product of the farm which commands a readier market than mutton and lamb, and there is none which pays so large a percentage on the investment. We wish the Cotswold, South Downs, New Oxfordshire and Shropshire Downs, could be introduced into every town in Massachusetts.

The display in the hall was really very fine; the different branches of domestic industry were represented, as also the larger manufacturers.

But the fruits shown would have done credit to any county in the State, especially in those noble fruits so peculiarly our own, the apple and pear. Of the latter, very fine and numerous specimens were from Dr. Fisher and Mr. Wood. There were some very handsome Isabella and Fitchburg grapes, but pre-eminent were the splendid clusters of the Concord, at the present time the most popular grape in New England.

The vegetables too were in large quantities and unusually good. Butter and cheese were not as well represented as they should have been.

At half-past twelve a very handsome collation attracted the attention of about three hundred, after which sensible and instructive remarks were made by Hon. Simon Brown, Charles L. Flint, Esq., Colonel Crocker and others. Notwithstanding the weather, the day passed off in a spirited, orderly and satisfactory manner.

I suppose the officers of this society best know their own business and the reqirements of their people, but it seems to me that there was upon that ground plenty of material to interest and instruct the masses for two days. It is impossible to make the critical examinations, proper to be made, when stock is

good, all good, and much so nearly alike in excellence. Then those of the visitors and spectators do not derive the advantage they should when ploughing, drawing and the exhibition of horses, all are proceeding at the same time. One can only get a curious glance in passing from one to another, rather than what one ought to have,—a thorough inspection. Certainly no half-day could be better employed than in examination and comparison of stock, learning one from another, the breeds, the crosses, the mode of rearing, feeding, &c., practiced by those who showed the most desirable animals.

It would also give a favorable opportunity for the sale and exchange of cattle, "mis-mating" and "matching up" of steers and oxen—taking the first step towards what is so desirable to establish through the State, a system of fairs or open markets, a matter which is now attracting much attention here; and in some parts of the State, Franklin county for instance, where it has been discussed for three years, and will probably be established within a year. The suggestion may be valueless, but I desire at least to call attention to it.

I am under obligations to Dr. Fisher for kind attentions and for facilities of examination.

James S. Grennell, of Greenfield.

WORCESTER SOUTH.

The 20th of September last, the time of the annual cattle show by the Worcester South Agricultural Society, was ushered in by severe frost; and a keen but bracing breeze from the north-west whistled merrily over the hills in the neighborhood of Sturbridge, as in the company and by the politeness of the president of the society, I was conveyed to the grounds occupied by the various departments of the exhibition. It was an occasion which evidently excited a strong interest among the inhabitants of the various towns connected with the society, and the large collection of people pouring into the town, gave a life to the scene which augurs well for the future success of this comparatively young society.

After a glance at the cattle pens, which were fast filling with the various animals to be offered for premiums, we proceeded to the hill on the south of the village, to witness the contest of the participators in the ploughing match. The event proved, however, that we might very well have spared all haste, as something more than an hour passed away after the time appointed by the published programme before the teams were arranged and started, and this want of punctuality was carried through all the transactions of the day, taking away much from its pleasure by leaving much idle time to be passed under a cold and uncomfortable wind during the middle of the day, and making it necessary to hurry all the closing business of the occasion, because both managers and visitors had imperative business demanding their attention at home.

This fault, marring very much the interest of the occasion, seemed to me to have its origin in the want of thoroughness in the preliminary arrangements for the exhibition, in consequence of which none of the officials of the show appeared to understand what duties were expected of them.

I would suggest to the managers of this society that hereafter there should be no waiting for committees or competitors, but that every thing should proceed with as much punctuality as the clock.

But to return to the ploughing. The soil was a stiff, clayey loam, with a very tough sod, and called forth all the energies of drivers and teams, in consequence of the frequent occurrence of small stone, requiring great watchfulness on the part of the ploughman to prevent his plough from being suddenly ejected from the furrow. But, notwithstanding all the difficulties, the work was admirably performed, without any violent whipping of the cattle or undue vociferation. Apparently, each man labored much as he would have done upon his own farm, and the work performed reflected great credit upon all parties concerned.

After the ploughing match I made a more thorough examination of the cattle pens, which contained many very fine animals, the Durham and Devon blood prevailing. Very few ordinary cattle were exhibited, and most of them exhibited the indications of good care and keeping. Many very fine working cattle were also present to compete for the premiums offered in

that department, and most of them performed the allotted task of drawing and backing a heavy load upon a steep hill admirably. Indeed, the display of cattle, taken as a whole, was one of the finest I ever witnessed for its extent.

The exhibition of fruit, butter, cheese, &c., claimed my attention as the next object of interest. It was a matter of surprise to me to find vegetables almost excluded from the hall, the only specimens consisting of one small lot of cabbages and squashes. The importance of many varieties of vegetables for feeding stock would, I should suppose, have led the trustees to offer premiums in this department, and I have no doubt if this were done, the beauty of the exhibition, at least, would be very much increased.

Residing in a county where fruit culture has received great attention, and where very beautiful specimens abound upon the tables at all public exhibitions, I was extremely disappointed upon inspecting the fruit offered at the show at Sturbridge. The number of varieties was large, and these were for the most part valuable in kind, but very many of the specimens were inferior and indicated a want of careful cultivation. A great improvement, too, might be made in the mode of exhibiting, and I have no doubt that more care in arranging the tables would have added much to the beauty of the exhibition. If, instead of a single specimen placed upon the bare table, the varieties being crowded into a small space, each competitor was required to exhibit at least eight specimens, and those specimens were carefully selected, placed upon as many separate dishes, the exhibition of fruit would be much more creditable in every way to the society. It was, however, very gratifying to me to witness the beautiful specimens offered by the dairy women of Worcester South of the products of their labor and care, in the form of butter and cheese which were abundant and of fine quality, and I think no person could examine them, in connection with the bread made from the products of their own farms, without being deeply impressed with the feeling that as regards the care of the inner man, the farmer has a large source of profit which the wealth of the merchant must often fail to procure in the markets of our cities. Indeed, I could not avoid entertaining the wish that I could serve upon the bread and butter committee, as the dinner was postponed until the late,

though highly fashionable, hour of three o'clock, P. M. Upon the whole, the exhibition of the Worcester South Society left upon my mind very pleasant impressions in all respects except that of punctuality, and the hours passed in the pleasant family of the president, Hon. O. C. Felton, will ever be among the bright spots upon which my memory loves to dwell.

JOHN C. BARTLETT.

HAMPSHIRE, FRANKLIN AND HAMPDEN.

Your delegate to the Hampshire, Franklin and Hampden Agricultural Society, being its fortieth anniversary, held at Northampton, October 13 and 14, 1858, would beg leave to report: That he has attended to that service as well as the weather would permit. The first day it rained hard nearly all day. The grounds, which are finely adapted for show grounds, were like a wet sponge; but notwithstanding the rain, the president, Col. Edwards, accompanied by his secretary, were on the grounds attending to their duties with as much care as though the sun was out. I have never witnessed more fine, well-matched oxen, at one exhibition, than at this show; the owners or keepers were in attendance with a just pride of their charge. The Messrs. Lathrops, of Hadley, were out in all the rain in attendance on their fine short-horns. Had the day been pleasant the show would have been larger, and the cattle would have appeared to more advantage, and the company would have been more numerous. Horses, swine and sheep all appeared well. In fact, this society has much to encourage it in its labor; the scenery is delightful, the town beautifully situated, and the lands are very fertile.

At the hall there was a fine exhibition of fruits and vegetables, and many things to amuse and instruct visitors.

The address by Dr. Loring, of Salem, was calculated to stimulate the farmers to renewed action and to a just estimation of the high position they fill. At the dinner table the hall was crowded by ladies and gentlemen, who listened to the remarks of the governor and other speakers, and more so then the ladies

who seemed to speak with illumined countenances, which I understood to mean that they were determined to do their part in elevating the course of rural affairs. I cannot close without saying, I have never attended a show where there was less bustle and more good order than I found under the direction of president Edwards, for the kind attention received from all, has left on my mind a day well and pleasantly spent.

B. V. French.

HAMPSHIRE.

By appointment as delegate from the Board of Agriculture, I was in attendance upon the ninth annual fair of the Hampshire County Agricultural Society, and witnessed with pleasure and profit the success and completeness of the exhibition. Notwithstanding the weather after the opening day of the exhibition was cold and stormy, the interest of the visitors could not be checked until the programme had been completed.

The annual address was made before the members of the society and as many earnest hearers as could find room in the spacious church, by his excellency N. P. Banks. Subject: "The development of American wealth by the labor and inventive genius of the people, and the character and need of the agricultural interest."

Such were my impressions after an examination of the contributions made to the fair, and an acquaintance with many of the active members of the society, that I was led to an examination of the history of its doings. The society was formed in the year 1850 with 340 members, and has increased to 1,010. The treasurer has received since its organization, (independent of State contributions,) $6,763.88, to which may be added State contributions, $4,800 ; making a total sum of $11,563.88. The number of entries made on the secretary's books for premiums as ascertained, is 7,155. The number of premiums earned and awarded, 2,205. Amount of premiums paid and other disbursements of the treasurer, as ascertained, seven thousand nine hundred and sixty-six $\frac{32}{100}$ dollars ; leaving to credit of perma-

nent fund thirty-five hundred and ninety-seven $\frac{46}{100}$ dollars, this being the same sum as reported in 1856.

This society has wedded to its interests J. W. Boyden, who, having ably served as the secretary of the society since the day of its organization, is willingly accepted by your delegate as sponsor for its increasing prosperity and usefulness.

The officers of the society have won the esteem and confidence of a majority of the inhabitants of the county by inviting annual addresses to be made before them by the most distinguished writers upon the subject of agriculture, and by husbanding innumerable facts bearing upon their cause, which were garnered up in the minds of the many scientific men who have their homes with them.

These valuable contributions have been published by the society for gratuitous distribution throughout the country. The facts thus widely disseminated have made room for themselves by crowding out from many minds traditional notions, and impelling men to place themselves in a position to reap their harvests through the working of natural laws, and not as by miracles, so long after the day of miracles has gone by. Reports made to the society on—

Farms, Farm Accounts, Farming Implements.—Prof. Nash, Charles H. Field, T. P. Huntington, Prof. Snell, and Rev. John Sanford.

Ploughing, Subsoil Ploughing, Manures, Crops.—Pres't Hitchcock, Dr. Rice, S. C. Wilder, Prof. Nash, Samuel Powers.

Reclaimed Meadow Land, Reclaiming Pasture Lands.—Prof. Fowler, Hon. Joseph Smith.

Fruit, Orchards, Forest Trees.—Doct. Rice, L. Wetherell, P. Lathrop, Prof. Clark, and W. P. Dickinson.

Horses.—Levi Stockbridge.

Dairy Stock.—T. P. Huntington.

Oxen.—Levi P. Warner.

Fat Cattle.—Z. C. Montague, A. B.

Sheep.—John M. Emerson, A. M.

Swine.—

Bread.—J. W. Boyden. *Cheese.*—T. G. Huntington.

Butter.—John C. Carter. *Honey.*—Rev. J. E. Fisher and Reverdy Emerson.

Addresses, &c., by Hon. Marshall P. Wilder, Prof. Fowler, Rev. W. Clift, F. D. Huntington, D. D., Leander Wetherell, C. L. Flint, Hon. N. P. Banks, Hon. A. H. Bullock.

All the addresses were products of minds thoroughly imbued with the subject of agriculture, and are noticeable both for their merit and for their undilution with any other subject.

The horses shown at this exhibition were mostly of Morgan stock. A few were of the Messenger and Norman blood. The Messenger and Norman stock will increase in appreciation as fast as they are tested and known. The horses were generally well trained for work. Some of them were also instructed by professor Clark, who has found his recreation from study in teaching them what to the lower creation is the finality of science—obedience to man's will.

The horse holds second rank in nature. He does not war against any other race of animals, ever acting only on the defensive. His power of development is only limited by the bounds of our experience in his management. Public sentiment, having professor Clark and men of kindred spirit to develop it, will speedily correct the errors of the past, and bring into subjection the temper of that class of individuals whose brutal practices have hitherto brutalized the horse.

The show of cattle, sheep and swine was considered equal to that of any former year. The first premium on fatted cattle was awarded to Chester Smith, on a yoke of oxen weighing 6,000 pounds. Of the eighteen yokes of cattle entered in the drawing match, sixteen yokes were Durham and grade Durham.

In dairy stock, the herd of Ayrshires belonging to Luke Sweetser, now numbering twenty or more, arrested the attention of all thinking men present. This is the only pure Ayrshire stock owned in the county. As soon, however, as Mr. Sweetser is ready to dispose of any part of his herd, and the facts attaching to this class of stock become generally known, this blood will be circulated through the upland counties.

Prejudice alone prevents the rapid infusion of new strains of blood in rearing stock. It has been said that many of the improved breeds which take such high rank in England and in our own country wherever domesticated, would degenerate, if once brought into our climate and pastures. It should be remembered that they are subject to the same laws in their being with what we call native stock; and that if we fail to provide necessary shelter and fail to renew the exhausted

condition of our pastures, the remark will as certainly prove true in the case of the latter as of the former.

Of a catalogue of land animals numbering over 90,000, not one hundred can be made subservient to man, or in any way contribute to his enjoyment. It is natural to suppose that the improvement in stock will keep pace with our industry and intelligence, but it has not been so in the history of the American people. Until within a very few years, we have been half a century behind England and Holland in this matter. Farmers of New England should at once consider the fact, carefully fix their minds upon the classes in the various kinds of animals best adapted in all respects to their wants and circumstances, and leave all others to die out.

That human industry cannot begin and finish any thing at one and the same time, is clearly illustrated in the history of farming. The impulse which a protective tariff gave to the manufacturing interest, immediately following the declaration of peace in 1814, partially developed the agricultural resources of Massachusetts by the increased demand for the necessary supplies of life. When, however, the manufacturing interest became the dominant interest, diverting labor and capital from the field to the loom and the workshop, promising large returns and early independence from want and labor, farms were neglected, and a check was given to home culture which diminished the products of the soil when an increase was needed.

Notwithstanding all organized effort to repair this neglect, the evil has continued in force. The stimulus which the exhibitions and efforts of the Hampshire Society have given to agriculture has not yet reached the minds of the entire farming population of the county. The masses are not yet moved to systematic action. In old England, (I state upon the authority of one who has travelled at home and abroad,) where it costs as much to stock a rented farm as it does to buy and stock one of equal relative value here, the farmer pays one-tenth of his income to support the church and state, and lives much more comfortably than is usual in New England. Why should so many farmers leave the cultivation of the choicest fruits and vegetables, the fattening and raising of small stock, and the home consumption of these products, to the members of agri-

cultural societies, to swell alone the volume of their life current, gladdening their spirits, giving solidity and rotundity to their forms, and making them noticeable among their fellow men for their readiness and ability to labor.

In journeying in various directions, the observer can easily point out the homesteads of those whose names are unrecorded in the books of agricultural societies; and with equal certainty the homes of such as are but partially interested in the welfare of such societies, and quite indifferent to their own. These are generally worthy men, sons of sires who worked with a will in the days when a good portion of the value of their surplus product was expended in transporting it to market. They do not yet believe in the expediency of organized effort; or they fear that if they join an agricultural society, it will sometime become a failure; or they hope that the society may not be able to do without their personal aid, and wait, expecting its officers to come to them and ask them in. These notions ought to be abandoned. The societies will live without their assistance, but would be greatly benefited if these considerate men would come forward and add their influence to the aggregated power of the organizations, while there is room to receive them. If, during the winter months, the officers of the Hampshire Society were disposed to meet weekly in every neighborhood within their precincts, to discuss practical agriculture, they would, I doubt not, realize all the success and cordial co-operation which their distinguished knowledge and experience would entitle them to expect.

GEORGE M. ATWATER.

HAMPDEN EAST.

The Eastern Hampden Agricultural Society held its annual exhibition at Palmer, on the 5th and 6th of October last, under circumstances the most favorable. The weather proved auspicious and the attendance very large upon each day. It was evident from the great gathering of people of all ages and sexes, that they had been looking forward to the occasion as a jubilee or holiday where families from the remotest parts of the

association might assemble for the interchange of opinions and for the forming of new friendships. It is justly a source of pride and satisfaction to the farmers of this young society that its fairs are not far behind those of more experience and greater pretensions. In fact we were assured by those who attended the county fair of which this is a branch, that the exhibition of this society in most of its departments were quite equal to that of the parent institution although this is but its third annual exhibition. Your delegate would by no means represent this as a model society, except for its earnestness. The first day was set apart for the exhibition of all animals, (except horses,) all agricultural products, manufactured articles, horticultural productions, ploughing match, &c.

The show of neat stock was good, numbering about 225 animals, mostly grade stock, showing a larger proportion of the Devon than other blood. Although the bulls on exhibition were mostly of the Durham grade, but one pure blood Durham bull was observed, and that owned by S. R. Burroughs, of Warren, from the celebrated stock of Mr. Lathrop, of Hadley, which stood at the head, and probably would with a large competition. Several fine grade bulls were exhibited of the Devon blood; that of J. K. Knox, for his large size and fine proportions, attracted much attention. There was not a large number of milch cows on exhibition, but from the statement of the exhibitors they were of the first class. Twenty-three yokes of working oxen were exhibited, a large proportion of which were good, some very superior. A pair of four years old, owned by H. Wallace, of Holland, and a pair of five years old, owned by A. V. Blanchard, of Palmer, were looked upon with admiration by all, and the opinion expressed that it would be hard to find their equal.

The show of sheep was small, and small sheep. There was a good display of swine and of good breeds.

The ploughing match and trial of draft oxen was not entered upon with such spirit and ambition as this feature of the show demands.

The exhibition of agricultural products, manufactured articles, horticultural productions, &c., were at the vestry of the Congregational Church. The show of vegetables and fruit was large and in every respect creditable to this, and would be

to any other, society in the State. The society labor under a disadvantage in being compelled to crowd their specimens for exhibition into quite too small a space. In order to be true to my duty as a delegate from the State Board of Agriculture, I cannot but express my regret in this report that, amidst the fine display of agricultural products, there should be so poor a show of mechanical productions, that of agricultural implements in particular. Not a single plough, harrow, cultivator, or any other implement for farmers use were to be seen, and the subscriber would earnestly hope, for the honor of the farmers and mechanics of the Hampden Eastern agricultural society, that at future exhibitions there may be a good display in this branch of the mechanical department.

The dairy is not the staple product of this section of the State, yet this department was very creditable.

The ladies' department, last though not least, was well filled with the useful and ornamental.

Upon the second day, at an early hour came the show of horses. The entries were seventy-five—a larger number, as I was informed, than ever before exhibited. The exhibition of horses was spirited, and every way worthy of commendation, although there were a less number of valuable horses exhibited than might have been expected from the number of entries. A very fine Morgan horse owned by Dr. Wm. Holbrook, of Palmer, and one owned by Mr. Turner, of Southbridge, gave evidence of good blood and judicious training. Several fine specimens of breeding mares and colts were present, with which their owners may be satisfied and the society proud of such an exhibition.

After the show of horses came the address, which was given by Prof. Oliver Marcy, of Wilbraham, in the Congregational Church, upon the science of chemistry upon agriculture. The address gave evidence of a thorough knowledge of the subject, and is published for the benefit of all interested.

At the close of the address a procession was formed and passed to the Antique House, where a dinner was furnished and served by E. B. Shaw, Esq., which was bountiful and satisfactory in all respects. After the inner man had been made satisfied, came the committees' reports, which were any thing but interesting, on account of the tedious length and uncalled for remarks by committees at that time and place. The sub-

scriber would respectfully suggest the condensing of reports in future, and let the remarks go into the transactions of the society, instead of taking the time and wearying the patience to an unreasonable extent.

I should not be true to my own feelings were I not to express my thanks to the officers of the society, and mine host of the Antique House, for the very polite attention and hospitality which I received, rendering my sojourn with the Hampden Eastern Agricultural Society during their fair exceedingly pleasant.

JOSIAH WHITE.

BERKSHIRE.

It has been my pleasure, since I became a member of the Board of Agriculture, to visit the extremes of our Commonwealth. I have traversed over the sandy plains of Barnstable and Nantucket, and now I am permitted to climb the far-famed hills of old Berkshire. I find thrift and enterprise wherever I go. The agricultural interest of our Commonwealth is evidently advancing. Our farmers are learning the true secret, that soils exhausted by excessive culture, must be fed before a plentiful harvest can be obtained.

On the 7th of October last, it being the second day of the meeting of the Berkshire Agricultural Society, I arrived at Pittsfield. It was a dreary, unpropitious day. The first day of their exhibition was beautiful, which afforded an opportunity of making a very fine display of their stock, which was spoken of in terms of high commendation. On my arrival, warm-hearted and generous friends escorted me to that delightful eminence where stands the hall of one of the most ancient agricultural societies in our Commonwealth. Here I found in great abundance the products of the hand, as well as the products of the soil. The fine display of an infinite variety of potatoes and squashes, turnips and cabbages, more especially those seventy-three varieties of corn, all tended to show that old Berkshire is not a whit behind her neighbors in laying up in store for time to come. Even Nantucket was there represented in her far-

famed pumpkins. The exhibition of fruits, although limited in quantity and variety, was very creditable for a section of our State, where less attention is given to this subject than in some other counties. I have reason, however, to believe, that were more encouragement given to this department, a fine display might be drawn out from private resources, which are now entirely withheld from exhibition. In the floral department I could have wished a much more extensive display. I am wont to look to this department for the taste and industry of the ladies; this very essential adornment of all our agricultural fairs is mainly dependent on them. We seldom find men who have much taste for the cultivation of flowers, and if we do, it requires the skill of the fairer sex to arrange them in the most attractive form.

I need not speak of the infinite variety of fancy articles; they did great credit to those who manufactured and presented them. I was very much interested in the products of the dairy; those splendid cheese, not so much in repute now as in former time, still enough so to attract the attention of many admirers. Who could fail to desire at least one of them? In this however, I was doomed to be disappointed; my Berkshire cheese I have never seen. The entries of butter and bread were very large, and from appearance, of such excellence as to do great credit to the fair housewives of old Berkshire.

I was somewhat disappointed in not finding any exhibition of heavy manufactures as Berkshire, has the reputation of being a manufacturing district.

The ploughing match was conducted in a manner highly creditable to the farmers; the entries were large, and every part was executed in a superior and workmanlike manner.

From this interesting performance our attention was hastily called to the gathering of the multitude in the hall where we were permitted to take counsel together, and listen to admirable instruction from our worthy secretary.

I could but admire the fine display of awards, so beautifully arranged upon the platform. It was novel to me, it being the first time I had ever witnessed such an exhibition. It is worthy of imitation by other societies. These beautiful articles, ever present in the family, will remind the receiver of the source from whence they came, and will act as a stimulus to farther

attainments. I have enumerated many things which commanded my approbation, and gave me a high opinion of the proceedings of this ancient society, one of the oldest if not the oldest society in our Commonwealth.

But there were some things witnessed which led me to fear, that unless a check is put upon them, this old puritan stock, who have so long inhabited the hills of Berkshire, will soon be overrun by our young America. Their cattle shows will be converted into horse shows and horse racing.

This subject has engaged the attention of the Board of Agriculture, and I find some admirable resolutions passed by the Board in the transactions of 1856 ; still I fear this is a growing evil. I have witnessed it not only at Pittsfield, but in other places; it permeates every class of society. In connection with it the worst vices are engendered, such as gambling and drinking.

I am a great admirer of the horse and would encourage our farmers in raising the best breeds. The exhibition of these animals at Pittsfield, showed the great care which had been taken to select the very best, and had those on exhibition been controlled within the design of the society, it would have formed one of the grandest features of the occasion. As I had occasion to say then, in remarking upon this subject, there was a little too much horse ; so say I now, altogether too much. All other interests seemed to be absorbed in this one thing. Nor did it cease when the day closed, but a fresh start was taken for the morrow; and even after the society had finished its proceedings placards announced to the public that a purse of one hundred dollars had been made up, and a race was to take place the next day on the society's grounds. Thus the fast spirit enkindled at the opening of the exhibition could not be checked at its close. In this whirlpool of excitement, both old and young, rich and poor, priest and people, were borne away, and the design of this annual festival was in a great measure lost sight of. I am gratified to know that a large majority of the members of this society disapprove of the course pursued; and as the friends of agriculture, and the lovers of good order, they will speedily adopt measures to prevent the occurrence of like scenes again.

NATHAN DURFEE.

HOUSATONIC.

The seventeenth annual cattle show and fair of the Housatonic Agricultural Society was held at Great Barrington on Wednesday, Thursday, and Friday, 22d, 23d, and 24th of September last; and notwithstanding the inclemency of the weather, which was very severe for the season, the show and the attendance were generally considered quite equal if not superior to that of any one which has preceded it.

Early on the first day, the grounds were well filled with a fine show of cattle, cows, heifers, sheep, hogs and poultry, and the capacious hall of the society was occupied on the one side with household manufactures, including paintings and embroidery, &c., and on the other was a fine display of upwards of one hundred tubs of butter, and quantities of cheese, bread, honey, vegetables, seeds, &c., and in the centre were exhibited the fruits and flowers.

The cattle and cows were the finest which I have seen at either of the few shows which I have attended.

The butter was generally of excellent quality, and the vegetables unsurpassed; and finer specimens of seed corn are not to be found. There was some good fruit and a few flowers; but in these I was disappointed; and the fields of corn and other grains of the surrounding country told that it was rather to the substantials of life than to the luxuries that the farmers of Berkshire had devoted most of their energies. The old moss-grown apple trees, with broken limbs reaching to the ground, and stunted, gnarled fruit, seen in many an orchard, told the same tale. Occasionally there are to be seen a few vigorous young trees with fine fruit, showing what can be done when there is a will; and if the farmers will pay a little more attention to this department, they will find their fruits equal in abundance to their milk and honey.

On the second day of the show the horses were exhibited; and from early morn until noon the road was thronged with vehicles, and early in the day the hall and grounds were filled with anxious spectators; and the show of horses, old and young, and their trials of speed, seemed to stand first in interest and attraction.

The morning of the third day opened with steady, copious rain, and the numbers on the ground were few; but at the appointed hour eighteen horses and eight ox teams were on hand with their ploughs and ploughmen, and at the word of command all went ahead without regard to mud or rain, showing that the ploughmen were not disposed to look back, and that they were not salt to be dissolved. In about forty minutes they finished their work in good style, and all repaired to the hall to see the lion, and hear the reports and the address.

The president, Daniel B. Fenn, Esq., called to order and introduced Stephen E. Burrall, Esq., of New York, who extended a hearty welcome (in a speech said to be "of great beauty and eloquence,") to Capt. Hudson of the U. S. navy; to which the gallant captain responded in a style characteristic of the sailor, thanking them for the honor, and expressing his pleasure at being present and participating in a farmers' festival. Then Marshall Warren, Esq., delivered an address, full of beauty and useful suggestions. Next followed the reading of the reports and delivery of the awards in silver plate. This to me was a new thing, and worthy of imitation.

The whole show was highly successful, and all seemed pleased and happy. To the president, Mr. Fenn, the chief marshal, Mr. Dewey, Mr. Bushnell, and a host of others, farmers of Berkshire, I am greatly indebted for a hearty welcome, and kind attentions at the fair and elsewhere; and I shall always remember my visit to the Housatonic amongst the pleasant occasions of my life.

E. W. Gardner.

NORFOLK.

As the regularly appointed delegate from the State Board of Agriculture, I attended the Cattle Show and Fair of the Norfolk County Agricultural Society, holden at Dedham, September 28 and 29, 1858.

The weather being most delightful gave free scope for a full manifestation of the interest felt in the society's exhibition, by

the crowding thousands who poured into the town by every avenue and by all means of locomotion.

This society, although only in its tenth year, has in the Hon. M. P. Wilder, its president, and some of its members, such essential elements of success as to have placed it in position far beyond many of the other societies, numbering over 1,300 members.

The ploughing match was largely attended, and was contested by eleven competitors, most of whom performed their work in a creditable manner.

The spading match which succeeded, and which afforded much amusement, was entered into by some half dozen of our adopted fellow citizens with characteristic impetuosity; the sod was thoroughly inverted, and the ground left in handsome condition.

Lacking the attribute of ubiquity, I did not see the drawing match which took place about the same time, but proceeded to the examination of the stock in general. The display of horses was very fine, said to be the best ever made in the county; in number over one hundred and twenty-five.

Several very stylish and well built horses were entered as "thorough-bred;" some of which might have been, and others were not. The committee properly withheld the first and second premiums. I think there is too often a laxity on the part of committees in not strictly requiring an authentic pedigree of animals entered as "thorough-bred."

Men enter "thorough-bred" stock at our shows to add to the notoriety of the animals and themselves, and to make money from the services and progeny of such animals. On the strength of the award of the committee, which is a guaranty of the animal, they get great prices and reputation. Committees, therefore, should see to it that their warranties are made good by satisfactory evidence, and not merely by the assurance of an obliging neighbor, or to gratify a personal friend who may be quite sure the thing is all right, but doesn't happen to have the proof.

Several pairs of very handsome matched horses were driven round the track and numerous good roadsters.

Of the "neat stock" there was a large number; some pure blooded stock, some grades judiciously crossed, and some quite

the reverse. What can any person expect by crossing a Jersey on to an Ayrshire?

Fine animals are got by breeding the Jerseys or the Ayrshires upon our larger varieties of cattle; and probably these crosses will be of more value to the people at large than the pure blooded animals, which rule too high prices to become generally owned. Great judgment, therefore, should be exercised in crossing, to grade, not *de*grade.

Decidedly the finest part of this show was Motley's herd of some twenty-five Jerseys—undoubtedly the finest herd of that blood in this country, if not in the world. His cows, especially, cannot be surpassed. Mr. Hunnewell and Mr. Andrews also showed superior Jersey stock.

Of pure Ayrshires there were but few; a bull of Mr. Draper, and a heifer of Mr. Capen were noticeable. Of native stock and grades there were many—some very good. Two very fine cows, grade Jersey, famous for their milk, were exhibited by the able president, Hon. M. P. Wilder.

There were some capital swine, made up of different breeds; and the show of poultry was also remarkably good.

The sheep were not many in number, but very good. I believe that the Oxford Downs, of Mr. Motley, are not surpassed as a breed by any sheep in this country.

The display in the hall belonging to the society was in most departments excellent, particularly of fruits and flowers. Hon. M. P. Wilder exhibited over one hundred varieties of pears. A large entry of superior vegetables was also made.

At twelve o'clock, on Wednesday, the large church was well filled, when after a few well-timed remarks by the president, the address was delivered by J. S. Eldridge, Esq., of Canton—ornate, elaborate, and well delivered. I ought not to omit mention of a very graceful hymn sung before the address, written by Rev. C. C. Sewall, of Medfield. From the church we returned to the large upper hall in the society's building, where, instead of the usual dinner provided for the society, was a simple collation for the invited guests. The main part of the hall was occupied by the ladies of the various towns of the county, for a fair, the proceeds of which were to be devoted to payment of the society's debt—a most praiseworthy purpose, and which, judging from the hungry hundreds present, and the

captivating way in which they were served, must have been crowned with eminent success.

The first sentiment proposed was, "The Commonwealth," to which His Excellency Governor Banks responded in a sensible, eloquent and effective speech, most creditable to the man, and to the State which is honored by him. It was enthusiastically received. A sentiment complimentary to this Board was acknowledged by your delegate. Mr. Eldridge, Rev. Mr. Means, and Mr. Howard, were then successively called out, and spoke.

This tenth show of this society is said to have been the most successful it has ever holden, and in point of numbers, the largest in the State.

As the delegate of the State Board, I was treated with kind attention,—and I specially desire to thank Hon. M. P. Wilder, the ever courteous and considerate president, for unceasing kindness.

JAMES S. GRENNELL.

BRISTOL.

As delegate from the State Board of Agriculture, I attended the cattle show and fair of the Bristol County Agricultural Society, held at Taunton in September last.

The weather was propitious, and Taunton was thronged with the rural population, evincing a deep and popular interest in the exhibition.

The show of stock was upon grounds of the Messrs. White, near the village, which was very respectable, both in numbers and quality, comprising several different grades and native stock, with but a small sprinkling of pure blood.

The number of horses on exhibition was small, and not of an extra quality, though I noticed some fine young animals giving promise of improvement in future.

The number of swine was small, but good in quality.

The small number of sheep on exhibition indicated a want of interest in that pleasant and profitable branch of husbandry,

and may we not hope that the time is not distant, when by the aid of the dog law, and a judicious adjustment of the tariff, we may again see our hills and plains stocked with those useful animals.

The show of fowls was large and excellent.

I did not witness the ploughing match, but was informed that twenty-eight teams entered the list for competition, and the contest was spirited, and the work as a whole was well executed in the presence of a crowd of spectators.

I witnessed the drawing match, which was engaged in with much spirit by thirty competitors. Many of the teams were fine, and showed excellent training. The large numbers present showed this to be an important feature of the exhibition.

Central Hall was devoted to the display of manufactures and the fine arts, bread and the products of the dairy, fruit, flowers and vegetables.

The show of bread, butter and cheese would be an honor to any society in the State.

The show of fruit was rich and varied, comprising many of the choicest varieties of apples, pears, peaches, plums, and grapes. The grapes particularly were the finest I ever saw.

The vegetable kingdom was not well represented, hardly a sufficient variety for a farmer's dinner, though there were some fine specimens.

The number and variety of manufactures was not large, but excellent in design and workmanship. The fancy articles were numerous, beautifully arranged, and made a fine display.

I was not present the second day, but have been informed it was pleasantly and profitably occupied, the society holding their annual meeting in the morning, (an arrangement worthy of imitation by other societies,) and a public entertainment in the afternoon, in which some four or five hundred ladies and gentlemen participated, Dr. Nathan Durfee, the president of the society, presiding.

In conclusion, I would mention with gratitude the kind and gentlemanly reception given your humble delegate by the officers and others of the society.

Cyrus Knox.

BARNSTABLE.

It was my privilege to attend the fourteenth annual festival of the Barnstable County Agricultural Society, at Barnstable, on the fifth and sixth days of October.

The fair was held on the grounds of the society, which are beautifully located, and on which they have a track for the exhibition of horses, and a large and commodious hall, well adapted to the wants of this large and flourishing society. The entering, arranging, and examination of stock, and articles in the hall, and the ploughing match, occupied the first day.

But little good stock was exhibited. This county is not as much noted for its agriculture as it is for its commerce and the fisheries. It consists, as is well known, of the narrow peninsula of Cape Cod, some seventy miles in length, and for a considerable part of this distance not more than three miles in width, the distance to the fair in some cases being more than fifty miles. The soil for the most part is sand, and not as well adapted to the raising of stock as some other parts of the State. The show of cattle was not what it should have been. There are a great many good cattle on the Cape—as good cows as are to be found in the State, but for some reason they were not at the fair. There were exhibited some very good two and three years old steers, well matched, of native blood, some good heifers, and a superior calf five months old weighing 470 pounds. A good display of mares and colts, and some fine young horses. No matched, farm, or carriage horses, or fast horses, came under my notice; some good swine, and a few sheep. A pair of mammoth oxen, weighing 6,000 pounds, from the State Almshouse at Bridgewater, were exhibited by Mr. Goodspeed, the superintendent. They attracted great attention.

The lower floor of the hall was well filled with all those articles of domestic manufacture, vegetables, fruits, flowers and fancy articles, which are usually seen at any of our county fairs. The vegetables were of the first order, and I saw some as good apples, pears, quinces and cranberries, as I have ever seen.

In the ladies' department there was much to admire; beautiful flowers, and a large amount of useful, ornamental, and fancy

articles. To me there is no part of our exhibitions more important, attractive or interesting. To the ladies we are greatly indebted for much of the success attending these annual festivals, and I would that they be more encouraged to present for exhibition those beautiful articles of their industry, by being more liberally remembered in the distribution of the premiums. The presence of the ladies at our fairs is indispensable. Vice in all its forms; profanity, vulgarity and rowdyism of every hue, is checked and restrained, and even the drunken loafer is more a man in their presence. Where they lead, success is sure to follow. Of the great multitude present on the second day, filling the hall in all its parts and the grounds adjacent, I verily believe that more than three-fifths were ladies. The success of this society is a "fixed fact."

The ploughing match, which is so attractive and draws together such great numbers of people in other parts of the State, caused but little excitement here.

There was no exhibition of horses on the course that I saw, except the ladies' riding, which came off in the forenoon of the second day amid a great crowd of highly delighted and interested spectators. They were fearless, dashing riders, performing admirably, and managing their horses with great skill and judgment. It was the first equestrianship of ladies on the course, and the excitement was intense. Where thousands are made so happy, and receive so much pleasure, at so little expense, why not allow it?

The dinner on the second day, was the crowning feature of the exhibition. It was served in the large upper room of the hall, where four hundred ladies and gentlemen and invited guests partook of an excellent dinner. After being duly disposed of, the president of the society introduced the Hon. Emory Washburn, who proceeded to give the annual address in a speech of great ability and eloquence. It was an eminently good, practical, common sense speech, and was received with decided approbation by an attentive audience.

After the address, a beautiful harvest hymn, written for the occasion by F. W. Crocker, Esq., was sung to the tune of Old Hundred, in which the whole audience joined. Some remarks were then made by the president, relative to the affairs of the society, followed by interesting speeches from his excellency

Governor Banks, Major Brinley, Commander of the Ancient and Honorable Artillery Company, who was present, Hon. John S. Keyes, of Concord, George S. Taft, Esq., of Uxbridge, Hon. T. D. Eliot, of New Bedford, Colonel Isaac H. Wright, and some others, which occupied the entire afternoon. Never was I present on any occasion when the after-dinner speeches were all so excellent, and of so high an order. I regretted exceedingly that the speeches were not free to all, without the necessity of attending the dinner, or that any should have been excluded from the hall and dinner to make room for invited guests. And I also regretted that there was no time to hear the reports of the committees, or the awards of the premiums.

The exhibition closed with a splendid ball in the evening, at the agricultural hall, in which large numbers participated.

I would here acknowledge my indebtedness to Captain Alexander Baxter and the members of his family for great kindness and hospitality.

Finally, the exhibition in most of its departments, was well sustained, and there was evidence of an increased interest, which speaks well for the future prosperity and usefulness of this society.

S. H. Bushnell.

NANTUCKET.

In accordance with my appointment by the Massachusetts Board of Agriculture, I attended the third cattle show and fair of the Nantucket Agricultural Society, held on the 13th and 14th of October.

The grounds of the society for the exhibition of stock, are just out of the village, and are very pleasantly located, having a fine view of the village, and looking off on to old ocean, as though defying her and saying thus far and no farther shalt thou come. The grounds are not large, but large enough for the use of the society, which is yet in its infancy, but whose members are anticipating a large growth. The weather of the first day was rainy, and very unpropitious for the exhibition of stock of any kind. I visited the grounds about ten o'clock,

and found on them thirty-two cows, two yokes of oxen, four bulls, thirteen two and three years old cattle and seventeen horses. The cows, some of them, would compare quite favorably with the best at the exhibition of other societies in the State; also the young stock. The oxen and bulls would not. Should judge the horses to be good for the farm; for speed probably would not exceed 2:39½. Sheep, swine, poultry—none on exhibition. I was informed by the president of the society that the farmers were becoming interested in it, and intended to bring in more of their stock, but were prevented by the rain.

The ploughing match, it was supposed, would not take place as by the programme, on account of the rain; but it did. I was not there, and therefore cannot speak of its merits.

From the show grounds I next visited the great centre of attraction for Nantucket people, and all visitors to the island on this occasion,—the Athenæum Hall,—which I found alive and full of the most intelligent and industrious ladies that I ever saw, who were decorating and fitting it up in the most splendid style. Among the decorations were evergreens and mottoes extending from one end of the hall to the other, flowers of all descriptions, fruit with flowers formed into pyramids, bouquets, wax figures, paintings, and shells with mosses from old ocean and land, all, all tastefully arranged by the ladies, forming a most beautiful sight. In one corner of the room I observed some very nice house plants, and over them this motto, "we bloom in beauty." Back of the stage were hung paintings, shells tastefully arranged in frames, and over them the motto, "These are Thy glorious works, Parent of good," and others I might mention.

The needle work by the ladies was very fine, and much of it was pronounced by good judges, who were visitors on the occasion, to be equal to the best of French work. Fruit of all kinds, very fine, (with the exception of apples,) grapes, peaches, quinces, finer than I ever saw before. The sight was most beautiful to behold.

In one of the lower rooms of the building was the exhibition of vegetables, which was good, potatoes, carrots, beets, turnips, onions, pumpkins, squash,—all were large and fine; some corn, which was a very good specimen of the above vegetables. There was not a great display of butter; there was but one

entry, which was nice. Of cheese there was none on exhibition.

In the evening the hall was lighted by gas, and the scene was magnified to its utmost extent; it was crowded to its greatest capacity by both gentlemen and ladies, and the evening was spent in a very pleasant manner. Speeches were made by different individuals, interspersed with music on the piano and other instruments, accompanied with singing. Presuming that the exercises were satisfactory to all, on the second day I took a horse and buggy and rode out to Siasconset, my object being to see if the island home was as barren as represented. I found a large part of it lying to waste, but believe a greater portion of it might, by judicious management, be brought under a good system of cultivation. In passing along I stopped and conversed with a farmer whose lands looked as though they were well managed. He informed me that he commenced there some eleven years since, and that he carried all the hay he cut the first year, into his barn on his one horse cart, and that without side boards; that this year he cut some twenty or thirty tons. If that is a fact, it shows what may be done on a large part of the island.

Another had raised from one acre of land sixty bushels of corn. I believe that almost every thing that conduces to the sustenance of man may be raised, if proper attention is given to it. On my return I passed some well cultivated farms, on another road, if roads they may be called. I presume there would be a difference of opinion on that subject.

The evening of the second day was spent as the first, with the addition of an able and instructive address by Mr. Wetherell, of Boston, which was listened to with a good deal of attention by a large portion of the audience. Also, some remarks by Judge Marston, of Barnstable, which were well received.

In conclusion, I would most truly express my acknowledgment to Capt. E. W. Gardner, president of the society, and others, for their cordial kindness extended to me, and can say that the two days were spent very pleasantly by me.

CHARLES K. TRACY.

NATIONAL HORSE SHOW AT SPRINGFIELD.

The undersigned, having been appointed as delegates from the Massachusetts State Board of Agriculture to attend the National Horse Show at Springfield, attended to the duty assigned them, and were highly pleased and gratified with the exhibition throughout.

Limiting ourselves to a simple commendation, however, would not be doing justice to the society under whose auspices the show was held, or to the spirited and energetic officers and directors who managed it.

The whole plan of the exhibition must have been thoroughly matured to have enabled the managers to carry it through with so little apparent effort, and the greatest vigilance and activity were required to execute, from day to day, and from hour to hour, what had been carefully arranged long before.

The good order which everywhere prevailed was not the least remarkable feature of the week's proceedings; and the bringing together of fifteen or twenty thousand people, men, women and children, and again their subsequent dispersion, without confusion and without riot, speaks volumes in praise, not only of those who conducted the exhibition, but also of those who were present upon that interesting occasion. Such a scene, repeated from day to day for nearly a week, can be witnessed in no other country.

With regard to the animals exhibited, there can be no question as to their unrivaled superiority in one department, that of speed, and it is believed that never before have there been brought together so many fine stallions, both trotters and breeders.

Whether speed, however, was not made too much the great test, to the exclusion of other desirable qualities, in almost every department, was a query which suggested itself to us, only to be answered in the affirmative. Roadsters are not the only class of horses which we require; nor if it were, is speed the only requisite qualification.

An exhibition called "National," prepared with the expense, the labor, and the enterprise, which crowned this with success,

should be calculated for great ulterior views, not simply to gratify a host of people with the excitements of a race course.

The stand point at which the institution of horse shows should be regarded is, not the temporary pleasure which they may afford to those who visit them, but their public utility; and in the further remarks which we have to offer, we propose to keep this steadily in view. The result of this, and a succession of splendid displays like this, should show from year to year a marked improvement in the breed of horses for every purpose to which that noble animal is subservient to man.

It is much to be regretted that more attention has not been paid to raising a class of working horses, those especially best adapted for the purposes of draft, and truly designated, "the horse of all work."

The profit of breeding horses for speed is a very doubtful one. But there is no doubt that if more care were used by our farmers in breeding only from good sized mares with horses of good size and bone, and well proportioned for work, it would be reasonably remunerative. Horses of this description can be bred with certainty. They may be good for the carriage, they may prove fast; but if deficient in speed and style, they have, if of good size, a high value as horses for draft. A well made, stout animal, fit for a team horse in the city of Boston, will fetch from two to three hundred dollars at four years old; a greater price than the average of all the trotting horses in the country at the same age.

In England, where the breeding of all classes of horses is equally attended to, the working horse, such as the Clydesdale horse, the Cleveland Bay and the Suffolk Punch, used for carriage, and farming, and training purposes, are the only ones which show an agricultural profit in raising. The horses for the turf are bred principally by those who possess large landed interests, and who continue the practice as much from a sense of duty as from the individual pleasure derived from it, but without any realization or expectation of profit. Hence it is that fast horses in England do not appear on the premium lists of any agricultural show in England. The race course is their arena, and they mar, more often than they make, the fortunes of their owners.

The Cleveland Bays are perhaps the best breed for New England use. They are lighter in form and carriage than the Clydesdale and serve almost as well for the team as for the road. They are of the class of the old English carriage horses, and easily converted to any other use.

The introduction of mowing machines, and other new agricultural implements to be worked by horses, makes attention to this subject of daily increasing importance to the agriculturist, both as a breeder and as a worker of horses.

The Hampden County Agricultural Society has been the first to take the field in horse shows with a view to the improvement of the breed, and as it should do, will retain the pre-eminence. The grounds at Springfield are admirably adapted to such displays, and with each successive year improvements will doubtless be made, suggested by experience.

Your committee, in view of these circumstances, would venture to suggest that this general object, the improvement of the breeds of horses, can be best attained by continuing and systematizing an annual horse fair or market, to be held at a fixed time and place,—for example at Springfield,—whither ease of access by all the railways in the country, the beautiful grounds with convenient appurtenances, and the spirit and enterprise and open-handed liberality of its citizens, all invite.

Such a market instead of being held once in every year might perhaps successfully commence with holding one semi-annually, say on a given day in May and in October, and we feel assured that our friends at Springfield, when it became a "fixed fact," would see a greater attendance than was brought together at the late show, both of men and animals. The attendance would be more gratifying likewise, because it would be the natural, wholesome coming together of people engaged in an important branch of agricultural industry, which the magnitude of the transactions and exchanges effected upon the occasion would alone serve to measure.

This market would be a school which is very much needed in this country. It requires but little wit to know which horse wins a race, if one stands at the winning post, or which animal draws the heaviest weight, after looking at the tests; but it does require sagacity and great experience to select the best horse for any given purpose from a number which may be presented.

This knowledge is gained by large markets and by the advantage thus afforded of observation and comparison. In this way it is, that breeders who bring their products to a mart like this learn to measure the extent of their own deficiencies by seeing the excellences of others; each finds something to learn from those who are engaged in the same occupation, and but few will return to their homes without having acquired some new hints and ideas, which will appear afterwards in an improved class of animals at the market. Thus, these markets become a practical school of instruction, and result in the improvement of the race of horses generally, whether bred for one purpose or another.

One very important point of view for the interest of the breeder, we wish to suggest, which is, that the establishment of a regular market day like the one proposed, will enable those who undertake this branch of agricultural industry, to breed with a certainty as to a market and with less of a lottery than it now is, as to price. The effect of an open, large and fixed market, as is proposed in this case, would be to bring together a large concourse of those who wish to buy and those who wish to sell. They stand upon a neutral ground. It is not a seller going to seek a purchaser or a purchaser going to seek a seller; but they meet there fairly and openly for the purpose of a bargain. Now it is well known that such methods of transacting business, whether of horses or of any thing else, tends to establish a general tone or rate as to prices,—an average, which is necessarily a fair one. If a breeder or seller has in the opinion of a purchaser pitched his expectations too high, the purchaser looks around for some one who is more moderate in his views, and if he finds none, it satisfies him that he has been wrong in his calculations; so if a seller finds he is asking too much, because the purchaser does not come back to him, he discovers his error and comes down in his price. A sale in this way at a market price is made, and a market price is almost always satisfactory. As it is now, there is no approach to a market price and every man is accustomed to ask twice what he hopes to get for any animal that he offers.

There is another advantage in these markets which ought not to pass unnoticed. The seller and the buyer for his own wants, are more nearly brought together and a vast saving is effected to both by doing away with the intermediate half a dozen

jockeyings which carry the price which a breeder can profitably sell at to three times that price before the animal reaches the person who actually wants him for use. If it were known that horses of all kinds would be offered for sale at a horse market on any day of the year; if the day were entered in the almanacs as regularly as the eclipses, the time of sunrise and sunset; if it were made known that this was a real horse market, that no premiums were offered, no betting allowed, no racing or trials of speed between horses; but that every facility would be furnished for any one to exhibit his horse, whatever his qualifications might be, a new and brilliant era would dawn upon this branch of agricultural enterprise.

This would bring horses of every class there. Buyers would meet what they wanted in the number thus exhibited, and would defer their purchases to this occasion. One day or more, if thought advisable, might be taken for an exhibition for prizes, which need be little more than diplomas to such as deserve it. Such charges upon stock entered and sold might be made as would cover the expenses attending the selling department. These fairs or open markets are common all over Europe, and have been found to work most successfully. Should one be established here, it would bring persons from every part of the United States either to sell or to buy.

This is one of those cases where a great general good might be accomplished at a comparatively small expense. The Commonwealth at large is interested in it, and there would seem to be no just reason why a small appropriation should not be made annually to assist the carrying out some such a plan as is here suggested.

A mere show is not enough; a passing interest is excited and then the whole thing is forgotten. But it would be very different with a fair established permanently, and held annually. Every farmer or breeder who has a horse to sell, prepares him for the annual fair. Dealers and others wishing to buy would take advantage of such an occasion to supply themselves, and the two classes are brought thus together from motives of self-interest,—a far better and more regular incentive, than a love for novelty or excitement, which is the motive power of too many that now attend our agricultural shows where trials of speed are allowed.

A great many persons attended the show at Springfield for the purpose of making purchases, who were surprised to find that the horses,—like fruits on the horticultural tables,—were for exhibition only. They went away disappointed in this respect, and would not probably repeat their visit, if only an exhibition of animals is intended.

These suggestions are thrown out, not only for the consideration of the managers and others who took an active interest in the late show, but also for the serious consideration of the State Board, as the first step in the initiation of a most important and desirable system of fairs or open markets, such as have for many years been held with such success in other countries, for the sale of horses as well as of all other domestic animals; and we should be glad to have this system emanate from such a respectable and influential starting point as Springfield.

If this plan should be approved, its execution might well be left to the energetic zeal and judgment of those to whom was intrusted the charge and conduct of the late exhibition, and from whose hands it went on to the records of the past as the most successful thing of the kind ever attempted in this country.

It is becoming in us at closing, to mention the kind civilities and attentions which we received from the managers and from citizens of Springfield.

RICHARD S. FAY.
PAOLI LATHROP.
JAMES S. GRENNELL.

APPENDIX.

AGRICULTURAL MUSEUM.

[The Collection of Rocks, Minerals and Fossils, in the State Cabinet, was obtained during the Geological Surveys of Massachusetts, between the years 1830 and 1840, by Dr. Edward Hitchcock, State Geologist, and he has furnished the following statement in regard to it. Later additions have been made and the entire collection has been rearranged and relabelled by him.]

Amherst College, December 1, 1858.

This Collection was made at different periods while the two Geological Surveys of the State were in progress, so that three sets of numbers were used, making the Catalogue appended to the Final Report quite inconvenient. A different arrangement is now practicable, and has been adopted. Each rock has now a separate series of numbers, so that additions can hereafter be made to them by merely extending that series, without disturbing the regular order.

The progress of Geology, also, since the Surveys were made, make some changes desirable. Additional discoveries have, in some cases, led us to alter the place of rocks upon the geological scale. But the doctrines respecting the Metamorphism of Rocks have produced the greatest alterations. Probably all geologists now agree in the opinion that all the rocks in the earth's crust, stratified and unstratified, have undergone important modifications through the influence of heat and water—that is, are Metamorphic. But the inquiry as to the nature and condition of the rocks before their metamorphosis is a much more difficult subject, on which geologists will have different opinions. Some take the ground that all stratified rocks were once fossiliferous; and it is quite common now to maintain that such was the case with all those in Massachusetts and New England generally. Others believe that thick deposits of stratified rocks were made before the creation of animals and plants, and these they call Hypozoic Rocks. That they have been subject to metamorphosis is admitted, but it has been a change from a less to a more crystalline condition, and not from fossiliferous to non-fossiliferous. This latter change, also, it is admitted, has passed upon some rocks, making them exceedingly to resemble the Hypozoic Rocks. That this change has been extensively produced upon the rocks of Massachusetts can hardly be doubted. But I am not prepared to say that we have no hypozoic strata protruding through the metamorphic, which were once fossiliferous. Nor can I as yet identify all the metamorphic strata with the original Silurian and Devonian formations out of

which they were probably formed. In such circumstances, I judge it best to give the names according to the lithological characters, in which all agree (ex. gr. gneiss, mica slate, talcose slate, argillaceous slate, hornblende slate, limestone, &c.), and in the heading of each rock indicate, so far as we know, from what fossiliferous rock it was derived. In some cases we feel quite confident what that rock was. For instance, coal plants have recently been found in the deposits extending north-easterly from Worcester down the Merrimack, marked on the Geological Map of the State and in the Catalogue as argillaceous and mica slate. The rock near Boston in which trilobites have been found is put into the Silurian and Cambrian formation. We are convinced that the limestones of Berkshire county belong to the older Silurian series, and not improbably all the other beds of this rock in the State have the same age, except perhaps that in Bernardston, which is probably as high in the series as the Devonian. But we have thought it best to leave all the limestones together, hoping that some organic relics may reward future researches. It seems now, also, to be proved that the Quartz Rock of Berkshire county is metamorphosed Potsdam Sandstone, containing, as it does in Vermont, the Lingula and Scolithus. But perhaps the quartz from other localities may not be of the same age, and, therefore, we leave all the quartzoze aggregates together under their lithological name.

Perhaps it ought to be added that the term Metamorphic, as here used, is limited to the changes which fossiliferous and not hypozoic rocks have undergone.

CATALOGUE.

The references in this catalogue (not as to numbers but descriptions) are to Hitchcock's Final Report on the Geology of Massachusetts: printed in 1841.

STRATIFIED ROCKS.

ALLUVIUM.

I. Soils.

1. Alluvium, Deerfield.
2. Alluvium, Northampton.
3. Alluvium, Deerfield.
4. Alluvium, Northampton.
5. Alluvium, Northfield.
6. Alluvium, Northampton.
7. Alluvium, West Springfield.
8. Alluvium, Westfield.
9. Alluvium, Westfield.
10. Alluvium, Stockbridge.
11. Alluvium, Hadley.
12. Alluvium, Sheffield.
13. Alluvium, Deerfield.
14. Alluvium, West Springfield.
15. Argillaceous alluvium, Springfield.
16. Argillaceous alluvium, Northampton.
17. Argillaceous alluvium, Plymouth.
18. Argillaceous alluvium, Barnstable.
19. Argillaceous alluvium, Sandwich.
20. Sandy alluvium, Wareham.
21. Sandy alluvium, Springfield.
22. Sandy alluvium, uncultivated, Northampton.
23. Loamy alluvium, Amherst.
24. Sandy alluvium, Sheffield.
25. Sandy alluvium, Truro.
26. Sandy alluvium, Barnstable.
27. Sandy alluvium, Gloucester.
28. Connecticut River Sandstone soil, Deerfield.
29. Connecticut River Sandstone soil, Longmeadow.
30. Connecticut River Sandstone soil, Wilbraham.
31. Connecticut River Sandstone soil, West Springfield.

32. Gray Sandstone soil, Granby.
33. Paleozoic soil, Dorchester.
34. Paleozoic soil, Roxbury.
35. Paleozoic soil, Brookline.
36. Paleozoic soil, Walpole.
37. Paleozoic soil, Dighton.
38. Paleozoic soil, Middleborough.
39. Paleozoic soil, Quincy.
40. Paleozoic soil, West Bridgewater.
41. Paleozoic soil, Watertown.
42. Paleozoic soil, Halifax.
43. Paleozoic soil, Cambridge.
44. Paleozoic soil, Taunton.
45. Paleozoic soil, Attleborough, east part.
46. Paleozoic soil, Attleborough, west part.
47. Argillaceous slate soil, Lancaster.
48. Argillaceous slate soil, Sterling.
49. Argillaceous slate soil, Townsend.
50. Argillaceous slate soil, Lancaster.
51. Argillaceous slate soil, Boston Corner.
52. Magnesian limestone soil, Marlborough.
53. Magnesian limestone soil, Lanesborough.
54. Magnesian limestone soil, Great Barrington.
55. Magnesian limestone soil, Adams.
56. Limestone soil, Saddle Mountain, Adams.
57. Limestone soil, Richmond.
58. Limestone soil, South Lee.
59. Limestone soil, Egremont.
60. Limestone soil, Williamstown.
61. Limestone soil, Stockbridge.
62. Limestone soil, Pittsfield.
63. Limestone soil, Sheffield.
64. Limestone soil, West Stockbridge.
65. Mica slate soil, West Boylston.
66. Mica slate soil, Webster.
67. Mica slate soil, Lunenburg.
68. Mica slate soil, Stockbridge Mountain.
69. Mica slate soil, Huntington.
70. Mica slate soil, Bradford.
71. Mica slate soil, West Newbury.
72. Mica slate soil, Methuen.
73. Mica slate soil, Pepperell.
74. Mica slate soil, Norwich.
75. Mica slate soil, Conway.
76. Mica slate soil, Russell.
77. Mica slate soil, West Newbury.
78. Talcose slate soil, West Chester.

79. Talcose slate soil, Charlemont.
80. Talcose slate soil, Becket.
81. Talcose slate soil, Rowe.
82. Talcose slate soil, Mount Washington.
83. Talco-micaceous slate soil, Florida.
84. Talco-micaceous slate soil, Hancock.
85. Gneiss soil, Tewksbury.
86. Gneiss soil, Stow.
87. Gneiss soil, Bolton.
88. Gneiss soil, Uxbridge.
89. Gneiss soil, Mendon.
90. Gneiss soil, Tyngsborough.
91. Gneiss soil, Holden.
92. Gneiss soil, Dudley.
93. Gneiss soil, Templeton.
94. Gneiss soil, Rutland.
95. Gneiss soil, Westminster.
96. Gneiss soil, Royalston.
97. Gneiss soil, Fitchburg.
98. Gneiss soil, Petersham.
99. Gneiss soil, New Braintree.
100. Gneiss soil, Palmer.
101. Gneiss soil, Enfield.
102. Gneiss soil, New Salem.
103. Gneiss soil, Leverett.
104. Gneiss soil, Hardwick.
105. Gneiss soil, Ware.
106. Gneiss soil, Grafton.
107. Gneiss soil, Brimfield.
108. Gneiss soil, Leicester.
109. Gneiss soil, Otis.
110. Gneiss soil, Becket.
111. Gneiss soil, Sandisfield.
112. Gneiss soil, Tolland.
113. Gneiss soil, Northfield, South Farms.
114. Gneiss soil, Buckland.
115. Gneiss soil, Wareham.
116. Gneiss soil, Sturbridge.
117. Gneiss soil, Brimfield.
118. Gneiss soil, West Brookfield.
119. Gneiss soil, Oakham.
120. Gneiss soil, decomposing gneiss, Athol.
121. Granite soil, Westhampton.
122. Granite soil, Concord.
123. Granite soil, Duxbury.
124. Granite soil, Andover.
125. Sienite soil, Lynnfield.

126. Sienite soil, Marblehead.
127. Sienite soil, Manchester.
128. Sienite soil, Gloucester.
129. Sienite soil, Lexington.
130. Sienite soil, Danvers.
131. Sienite soil, Newbury.
132. Sienite soil, Dedham.
133. Sienite soil, Wrentham.
134. Sienite soil, North Bridgewater
135. Sienite soil, Weymouth.
136. Sienite soil, Sharon.
137. Sienite soil, Marshfield.
138. Sienite soil, Abington.
139. Porphyry soil, Kent's Island, Newbury.
140. Porphyry soil, Medford.
141. Porphyry soil, Malden.
142. Porphyry soil, Lynn.
143. Greenstone soil, Ipswich.
144. Greenstone soil, Woburn.
145. Greenstone soil, Deerfield.
146. Greenstone soil, Belchertown. New land, never manured.
147. Ferruginous limestone soil, Saddle Mountain.
148. Soil from Rushville, Illinois.
149. Soil from Sangamon County, Illinois.
150. Soil from Lazelle County, Illinois.
151. Soil from Peoria County, Illinois.
152. Soil from Scioto Valley, Ohio.

II. Clay, Sands, Marls, Ochres and Drift.

1. Muck sand, Sunderland.
2. Muck sand, Bradford.
3. Muck sand, West Springfield.
4. Muck sand, Hadley.
5. Muck sand, Sheffield.
6. Muck sand, Northfield.
7. Muck sand, Amherst.
8. Muck sand, Leominster.
9. Marsh mud, Cambridge.
10. Marsh mud, Newburyport.
11. Marsh mud, Medford.
12. Alluvial clay, Newbury.
13. Alluvial clay, Manchester.
14. Alluvial clay, Northfield.
15. Alluvial clay, Sunderland.
16. Alluvial clay, Amherst.
17. Alluvial clay, Kingston.
18. Alluvial clay, Lowell.

19. Porcelain clay, Norwich.
20. Marly clay, Williamstown.
21. Marly clay, North Adams.
22. Marl, Buck's Farm, Stockbridge.
23. Marl, Pittsfield.
24. Marl, West Stockbridge.
25. Marl, North Stockbridge.
26. Marl, South Pittsfield.
27. Marl, Sedgwick's Mills, Lee.
28. Calcareous alluvium, Chicopee Falls.
29. Calcareous alluvium, Water Shops, Springfield.
30. Calcareous alluvium, West Springfield.
31. Siliceous marl. (Bergemehl or Mountain meal,) Spencer. [See Plate 20, figures 9 to 12.]
32. Apothemite, Newbury.
33. Decomposing greenstone, Mount Holyoke.
34. Yellow ochre, Athol.
35. Yellow ochre, Monroe.
36. Yellow ochre, Newbury.
37. Moulding sand, Foxborough.
38. Moulding sand, Montague.
39. Decomposed granite, Norwich.
40. Siliceous marl, or fossil infusoria, Barre.
41. Fossil infusoria, Andover.
42. Fossil infusoria, Bridgewater.
43. Marl, Bassett's bed, near the surface, Lee.
44. Marl, 10 feet deep, Bassett's bed, Lee.
45. Marl, C. Bassett's bed, Lee.
46. Mal, Sedgwick's Mills, Lee.
47. Marl, North Stockbridge.
48. Marl, Farmington, Connecticut.
49. Alluvial clay, South Palmer.
50. Alluvial clay, under Connecticut River, Springfield.
51. Decomposed granite, New Jersey.
52. Decomposed granite, (moulding sand for brass,) New Jersey.
53. Moulding sand, Albany, New York.
54. Moulding sand, Shutesbury.
55. Moulding sand, Connecticut.
56. Yellow ochre, Bedford.
57. Yellow ochre, Harwich.
58. Moulding sand, New York.
59. Marly clay, South Lee.
60. Alluvial clay, Plymouth.
61. Chromate of potassa from the Chester chromate of iron.
62. Chromate of lead from the Chester chromate of iron.
63. Bichromate of lead from the Chester chromate of iron.
64. Geate of alumina from soils.

65. Geate of lime from soils.
66. Geate of potassa from soils.
67. Geine from soils.
68. Sand, Leominster.
69. Sand, Amherst.
70. Sand, Lock's Pond, Shutesbury.
71. Pyrope sand, Brimfield.
72. Gravel, Leominster.
73. Ferruginous gravel, Leominster.

74 to 89 consists of sand, gravels and clays, from borings beneath Connecticut River, at Springfield, executed by Major Whistler. The first eight specimens were taken from the depths indicated, at the abutment on the east bank, shown on the section, figure 67, by the perpendicular line most to the left. The second eight were taken from beneath the fourth pier, shown by the fifth perpendicular line, reckoning from left to right.

74. Coarse sand, abutment, depth 5 feet 9 inches.
75. Clay, not marly, abutment, depth 7 feet.
76. Clay, not marly, abutment, depth 10 feet 9 inches.
77. Marly clay, abutment, depth 20 feet 9 inches.
78. Marly clay, abutment, depth 25 feet 9 inches.
79. Marly clay, abutment, depth 30 feet 9 inches.
80. Sand, calcareous, abutment, depth 32 feet 9 inches.
81. Sandy gravel, calcareous, depth 39 feet 5 inches.
82. Coarse sand, pier No. 4, depth 5 feet.
83. Muck sand, pier No. 4, depth 6 feet 6 inches.
84. Marly clay, calcareous, depth 20 feet.
85. Muck sand, very marly, depth 30 feet.
86. Coarse marly sand, depth 34 feet.
87. Gravel, depth 35 feet.
88. Coarse sand and pebbles, depth 40 feet.
89. Gravel, depth 43 feet 6 inches.

At 45 feet from the bottom of the river were found rounded stones from 6 to 12 inches in diameter.

90 to 94 consist of clay and sand from a boring made for water in East Boston, in 1855.

90. Argillaceous clay, depth 135 feet.
91. Fine whitish clay, depth 192 feet.
92. Sandy clay, depth 197 feet.
93. Fragments of slate, (silurian,) depth 198 feet.
94. Fragments of slate, (silurian,) depth 202 feet.

At this depth a salt water spring was struck, and the work abandoned.

95. Sand, consolidated, Plymouth.
96. Sand, consolidated, Pownal, Vermont.
97. Coarse sand, consolidated, Pownal, Vermont.
98. Gravel, consolidated, Pownal, Vermont.
99. Gravel, consolidated, Pownal, Vermont.

100. Ferruginous conglomerate, Montague.
101. Calcareous alluvium, Springfield.
102. Calcareous breccia, West Stockbridge.
103. Hornstone, (boulder,) Plymouth.
104. Galena from a boulder, Dedham.
105. Pyrula carica, (47 feet below the surface,) Nantucket.
106. Pyrula carica, worn, Nantucket.
107. Natica heros, Nantucket.
108. Crepidula fornicata, Nantucket.
109. Venus Castanea, Nantucket.
110. Mactra —— Nantucket.
111. Clay, Amherst.
112. Clay, Leominster.
113. Clay, Leominster.
114. Loamy clay, Leominster.
115. Clay, West Springfield.
116. Clay, Palmer.
117. Clay, Taunton.
118. Clay, rhomboidal, West Springfield.
119. Clay, rhomboidal, West Springfield.
120. Clay, rhomboidal, West Springfield.
121. Clay, rhomboidal, Deerfield.
122. Clay, rhomboidal, Deerfield.
123. Clay, Fuller's earth, Northampton.

Claystone Concretions. Form of a Sphere.

124. Claystone concretions, South Hadley. (Plate 16, figure 25.)
125. Claystone concretions, Holyoke.
126. Claystone concretions, Holyoke.
127. Claystone concretions, Holyoke.
128. Claystone concretions, Holyoke.
129. Claystone concretions, Holyoke.
130. Claystone concretions, Amherst.
131. Claystone concretions, Hadley.

Form of an oblate Spheroid.

132. Claystone concretions, Hadley.
133. Claystone concretions, Hadley.
134. Claystone concretions, Agawam.
135. Claystone concretions, Agawam.
136. Claystone concretions, Wethersfield, Connecticut.
137. Claystone concretions, Amherst.
138. Claystone concretions, Amherst.
139. Claystone concretions, Amherst.
140. Claystone concretions, Amherst.
141. Claystone concretions, Amherst.
142. Claystone concretions, Holyoke.

143. Claystone concretions, Amherst.
144. Claystone concretions, Amherst.
145. Claystone concretion, Hadley. (Plate 15, figure 18.)
146. Claystone concretion, Hadley.

Form of a prolate Spheroid.

147. Claystone concretion, Montague.
148. Claystone concretion, Montague.
149. Claystone concretion, Montague.
150. Claystone concretion, Montague.
151. Claystone concretion, Sunderland bridge.
152. Claystone concretion, Sunderland bridge.
153. Claystone concretion, Sunderland bridge.
154. Claystone concretion, Sunderland bridge.
155. Claystone concretion, Sunderland bridge.
156. Claystone concretion, Sunderland bridge.
157. Claystone concretion, Sunderland bridge.
158. Claystone concretion, Sunderland bridge.
159. Claystone concretion, Sunderland bridge.
160. Claystone concretion, Sunderland bridge.
161. Claystone concretion, Sunderland bridge.
162. Claystone concretion, Sunderland bridge.
163. Claystone concretion, Sunderland bridge.
164. Claystone concretion, Sunderland bridge.
165. Claystone concretion, Sunderland bridge.
166. Claystone concretion, Hadley.
167. Claystone concretion, Hadley.
168. Claystone concretion, Hadley.
169. Claystone concretion, Hadley.
170. Claystone concretion, Hadley.
171. Claystone concretion, Wethersfield, Connecticut.
172. Claystone concretion, Wethersfield, Connecticut.
173. Claystone concretion, Wethersfield, Connecticut.
174. Claystone concretion, Wethersfield, Connecticut.
175. Claystone concretion, Wethersfield, Connecticut.
176. Claystone concretion, Wethersfield, Connecticut.
177. Claystone concretion, Wethersfield, Connecticut.
178. Claystone concretion, Wethersfield, Connecticut.

Annular Claystone Concretions.

179. Claystone concretion, Hadley. (Plate 15, figure 1.)
180. Claystone concretion, Hadley. (Plate 15, figure 2.)
181. Claystone concretion, Hadley.
182. Claystone concretion, Hadley.
183. Claystone concretion, Hadley.
184. Claystone concretion, Hadley.
185. Claystone concretion, Hadley.

186. Claystone concretion, Hadley.
187. Claystone concretion, Hadley.
188. Claystone concretion, Hadley. (Plate 15, figure 4.)
189. Claystone concretion, Hadley.
190. Claystone concretion, Hadley.
191. Claystone concretion, Hadley.
192. Claystone concretion, Hadley.
193. Claystone concretion, Hadley.
194. Claystone concretion, Hadley.
195. Claystone concretion, Hadley.
196. Claystone concretion, Hadley. (Plate 15, figure 8.)
197. Claystone concretion, Hadley.
198. Claystone concretion, Hadley.
199. Claystone concretion, Hadley.
200. Claystone concretion, Hadley. (Plate 15, figure 11.)
201. Claystone concretion, Hadley.
202. Claystone concretion, Hadley.
203. Claystone concretion, Hadley.
204. Claystone concretion, Hadley.
205. Claystone concretion, Hadley.
206. Claystone concretion, Hadley. (Plate 16, figure 27.)

Lenticular Claystone Concretions.

207. Claystone concretion, Amherst. (Plate 16, figure 21.)
208. Claystone concretions, Amherst.
209. Claystone concretions, Amherst.

Cylindrical Concretions.

210. Claystone concretion, Agawam.
211. Claystone concretion, Agawam. (Plate 17, figure 55.)
212. Claystone concretion, Hadley.
213. Claystone concretion, Holyoke.

Compound forms, &c., of Claystone Concretions.

214. Claystone concretions, North Adams.
215. Claystone concretions, North Adams.
216. Claystone concretions, North Adams.
217. Claystone concretions, North Adams.
218. Claystone concretions, North Adams.
219. Claystone concretion, South Hadley.
220. Claystone concretion, Holyoke.
221. Claystone concretion, Holyoke.

Ferruginous Clay Concretions.

222. Ferruginous concretions in clay, Deerfield.
223. Ferruginous concretions in clay, Deerfield.
224. Ferruginous clay concretions, South Hadley Canal.

225. Ferruginous clay concretions, South Hadley Canal.
226. Ferruginous clay concretions, Deerfield.
227. Ferruginous clay concretions, Charlestown.
228. Ferruginous clay concretion, Deerfield.
229. Ferruginous clay concretion, Deerfield.
230. Ferruginous clay concretion, Deerfield.
231. Ferruginous clay concretion, Deerfield.
232. Ferruginous clay concretion, Deerfield.
233. Ferruginous clay concretion, Deerfield.
234. Ferruginous clay concretion, Deerfield.
235. Ferruginous clay concretion, Deerfield.
236. Ferruginous clay concretion, Deerfield.
237. Ferruginous clay concretion, Deerfield.
238. Ferruginous clay concretions, Deerfield.
239. Ferruginous clay concretion, Deerfield.
240. Ferruginous clay concretion, Deerfield.
241. Ferruginous clay concretions, Deerfield.
242. Ferruginous clay concretions, Deerfield.
243. Ferruginous clay concretions, Deerfield.
244. Ferruginous clay concretions, Hadley.
245. Ferruginous clay concretion, Hadley.
246. Ferruginous clay concretions, Deerfield.
247. Ferruginous clay concretions, Deerfield.
248. Ferruginous clay concretions, Manchester.
249. Ferruginous clay concretion, Manchester.
250. Ferruginous clay concretion, Manchester.
251. Fossil infusoria, Shutesbury.
252. Marl, Pittsfield.
253. Planorbis parvus and P. bicarinatus in marl, Pittsfield.
254. Planorbis trivolvis in marl, Pittsfield.
255. Lymnæa heterostropha and L. catascopium in marl, Pittsfield.
256. Cyclas —— in marl, Pittsfield.
257. Peat, Pittsfield.
258. Peat, Pittsfield.
259. Peat, Leverett.
260. Peat, Hadley.
261. Peat, Weston.
262. Peat, Weston.
263. Peat, Northborough.
264. Peat, Shrewsbury.
265. Peat, Wilbraham.
266. Peat, Sunderland.
267. Peat, Westborough.
268. Peat, Lee.
269. Peat, Lee.
270. Peat, Hubbardston.
271. Bog iron ore, Brookfield.

272. Bog iron ore, New Braintree.
273. Bog iron ore with petrified carox, New Braintree.
274. Wad, (protoxide of manganese,) Conway.
275. Wad, Leverett.
276. Wad, Whately.
277. Wad, West Stockbridge.
278. Calcareous concretion in a cave, Lanesborough.
279. Calcareous concretion in a cave, Lanesborough.
280. Cadmia, Van Deusenville Furnace, Stockbridge.
281. Manganese from the hearth of the iron furnace, Richmond.
282. Surface soil, Truro.
283. Sand, depth 2 feet, Cliffs, Truro.
284. Sand, depth 5 feet, Cliffs, Truro.
285. Sand, depth 10 feet, Cliffs, Truro.
286. Sand, depth 15 feet, Cliffs, Truro.
287. Sand, depth 25 feet, Cliffs, Truro.
288. Sand, depth 50 feet, Cliffs, Truro.
289. Sand, depth 100 feet, Cliffs, Truro.
290. Sand, depth, 140 feet, Cliffs, Truro.
291. Sand from the base of the Cliffs, Truro.

III. Pliocene Tertiary.

1. Brown hematite, stalactical, Richmond.
2. Brown hematite, stalactical, West Stockbridge.
3. Brown hematite, pavonine, West Stockbridge.
4. Compact hematite, Richmond.
5. Mammillary hematite, Lenox.
6. Hematite and yellow ochre, West Stockbridge.
7. Hematite and red oxyd of iron, West Stockbridge.
8. Hematite and radiated manganese, West Stockbridge.
9. Gibbsite, Richmond.
10. Clay, West Stockbridge.
11. Pyrolusite, West Stockbridge.
12. Sphaerosiderite, West Stockbridge.
13. Fibrous hematite, Richmond.
14. Stalactical hematite with dendrites, probably of manganese, West Stockbridge.
15. Hematite with dendrites, Richmond.
16. Hematite with dendrites, Richmond.
17. Mammillary hematite with dendrites, Richmond.
18. Mammillary hematite with dendrites, Richmond.
19. Mammillary hematite with dendrites, Richmond.
20. Compact hematite, Richmond.
21. Compact hematite, Richmond.
22. Compact hematite, Richmond.
23. Compact hematite, Richmond.
24. Vesicular hematite, Richmond.

25. Vesicular hematite, Richmond.
26. Vesicular hematite, Richmond.
27. Scaly red oxide of iron, (boulder,) Carver.
28. Gibbsite on hematite, West Stockbridge.
29. Yellow ochre, New Marlborough.
30. Red ochre, New Marlborough.

IV. Miocene Tertiary.

1. Clay, Gay Head, Martha's Vineyard.
2. Green sand, Marshfield.
3. Green sand, New Jersey.
4. Green sand, Gay Head.
5. Green sand, blackish, Gay Head.
6. White sand, Gay Head.
7. White clay, Gay Head.
8. Red clay, Gay Head.
9. Variegated clay, Gay Head.
10. Yellow clay, Gay Head.
11. Brown clay, Gay Head.
12. Whitish clay, Gay Head.
13. Red and White clay, Gay Head.
14. Yellow agglutinated sand, Gay Head.
15. Yellow agglutinated sand, Gay Head.
16. White agglutinated sand, Gay Head.
17. Green agglutinated sand, Gay Head.
18. Sand with clay, Gay Head.
19. Lignite, Gay Head.
20. Lignite, Gay Head.
21. Lignite, Gay Head.
22. Quartzose conglomerate, Gay Head.
23. Quartzose conglomerate, Gay Head.
24. Quartzose conglomerate, Gay Head.
25. Specimen of oolitic aspect, Gay Head.
26. Indurated clay, Gay Head.
27. Leaf of Salix (?) ——, on argillaceous iron ore, Gay Head. (Plate 19, figure 3.)
28. Leaves of Ulmus (?) ——, on argillaceous iron ore, Gay Head. (Plate 19, figure 2.)
29. Leaf of Ulmus (?) ——, on argillaceous iron ore, Gay Head. (Plate 19, figure 1.)
30. Impression of a seed vessel, Gay Head. (Plate 19, figure 4.)
31. Plants, Gay Head.
32. Cast of Venus ——, Gay Head. (Plate 19, figure 16.)
33. Cast of Tellina ——, Gay Head. (Plate 19, figure 17.)
34. Cast of Turbo ——, Gay Head. (Plate 19, figure 18.)
35. Concretion, Gay Head.
36. Concretion, Gay Head.

40. Concretions in sand, Nantucket.
41. Zoophyte (?) in conglomerate, Gay Head.
42. Fossil crab, Gay Head. (Plate 19, figure 19.)
43. Fossil crab, Gay Head.
44. Fossil crab, Gay Head.
45. Shark's tooth, Gay Head.
46. Shark's tooth, Gay Head. (Plate 19, figure 10.)
47. Shark's tooth, Gay Head. (Plate 19, figure 12.)
48. Crocodile's tooth (?), silicified, Gay Head. (Plate 19, figure 13.)
49. Vertebra (mineralized,) Gay Head.
50. Vertebra, Gay Head. (Plate 19, figure 7.)
51. Vertebra, Gay Head. (Plate 19, figure 6.)
52. Vertebra, (mineralized,) Gay Head.
53. Vertebra, Gay Head.
54. Fragment of a rib, Gay Head.
55. Fragments of bones, Gay Head.
56. Fragments of bones, Gay Head.
57. Bones with lignite, Gay Head.
58. Bones with lignite in conglomerate, Gay Head.
59. Bones with lignite in conglomerate, Gay Head.
60. Bones in conglomerate, Gay Head.
61. Perforated bone, Gay Head.
62. Iron pyrites, Gay Head.
63. Pisiform hematite, Gay Head.
64. Mammillary hematite, Gay Head.
65. Nodule of hematite perforated by lignite, Gay Head.
66. Nodular hematite, Gay Head.
67. Nodule of hematite perforated by lignite, Gay Head.
68. Columnar clayey iron, Gay Head.
69. Columnar clayey iron, Gay Head.
70. Columnar clayey iron, Gay Head.
71. Compact clayey iron, Gay Head.
72. Compact clayey iron, Gay Head.
73. Slaty clayey iron, Gay Head.
74. Ferruginous sandstone, Gay Head.
75. Selenite with lignite in clay, Gay Head.
76. White clay, Kingston.
77. Ferruginous conglomerate, Marshfield.
78. Concretion in green sand, Marshfield.
79. Fossil shell, Gay Head.
80. Fossil shell, Gay Head.
81. Fossil shell, Gay Head.
82. Fossil shell, Marshfield.
83. Fossil shell, Marshfield.
84. Fossil shell, Marshfield.
85. Lignite, Gay Head.
86. Lignite, Gay Head.

87. Lignite, Gay Head.
88. Lignite, Gay Head.
89. Ferruginous conglomerate, Gay Head.
90. Brown sand, Gay Head.
91. Decomposed granite, Gay Head.
92. Green sand, Gay Head.
93. Yellow clay, Gay Head.
94. Reddish clay, Gay Head.
95. Light brown clay, Gay Head.
96. Pinkish clay, Gay Head.
97. Red and white clay, Gay Head.
98. Red and white clay, Gay Head.
99. Red clay, Gay Head.
100. Brown clay, Gay Head.
101. Black clay, Gay Head.

V. Connecticut River Sandstone. *(Liassic and perhaps Triassic and Permian Sandstones and Limestones.)*

1. Coarse conglomerate, Greenfield.
2. Variegated conglomerate, Deerfield.
3. Variegated conglomerate, Deerfield.
4. Granite conglomerate, Bernardston.
5. Granite conglomerate, Westfield.
6. Conglomerate from the ruins of argillo-micaceous slate, Greenfield.
7. Conglomerate from the ruins of argillaceous slate, Bernardston.
8. Conglomerate from the ruins of argillaceous slate, Bernardston.
9. Conglomerate, from mica slate, talcose slate and granite, Mount Mettawampe.
10. Conglomerate, mouth of Miller's River.
11. Epidotic conglomerate, mouth of Miller's River.
12. Nodule from conglomerate, Miller's River.
13. Conglomerate from the ruins of granite, South Hadley Falls.
14. Conglomerate from the ruins of granite, Mount Holyoke.
15. Conglomerate, Belchertown.
16. Conglomerate, Amherst.
17. Conglomerate with a ferruginous concretion, South Hadley Falls.
18. Conglomerate, chiefly a nodule of granite, Amherst.
19. Gray conglomerate, Turner's Falls.
20. Tufaceous conglomerate, Smith's Ferry.
21. Tufaceous conglomerate, Smith's Ferry.
22. Tufaceous conglomerate, Smith's Ferry.
23. Tufaceous conglomerate, Smith's Ferry.
24. Coarse red sandstone, Hoyt's quarry, Deerfield.
25. Coarse red sandstone, Westfield.
26. Coarse red sandstone, Whately.
27. Water worn sandstone, Greenfield.
28. Coarse red sandstone, Greenfield.

29. Reddish sandstone, West Springfield.
30. Reddish sandstone, West Springfield.
31. Gray sandstone, Hoyt's quarry, Deerfield.
32. Reddish sandstone, Westfield.
33. Reddish sandstone, Longmeadow.
34. Sandstone with pieces of fine red micaceous sandstone partially imbedded, Turner's Falls.
35. Fine red sandstone, (smoothed,) Longmeadow.
36. Fine red sandstone, Longmeadow.
37. Coarse gray sandstone, adit of lead mines, Southampton.
38. Light gray sandstone, Mount Holyoke.
39. Gray sandstone, Turner's Falls.
40. Variegated sandstone, near greenstone, Titan's Pier, South Hadley.
41. Fine gray sandstone, West Springfield.
42. Fine gray sandstone, Amherst.
43. Gray sandstone, Turner's Falls.
44. Brecciated sandstone, Turner's Falls.
45. Micaceous gray sandstone, South Hadley.
46. Micaceous sandstone, under the greenstone, Mount Holyoke.
47. Micaceous sandstone, near greenstone, Mount Tom.
48. Micaceous sandstone, near greenstone, Turner's Falls.
49. Micaceous sandstone, near greenstone, Turner's Falls.
50. Micaceous sandstone, under greenstone, Mount Tom.
51. Amygdaloidal sandstone, near trap, Mount Tom.
52. Amygdaloidal sandstone, Granby.
53. Amygdaloidal sandstone, Northampton.
54. Micaceous sandstone, South Hadley.
55. Micaceous sandstone, Sunderland Cave.
56. Nodules of carbonate of lime, Sunderland Cave.
57. Nodules of carbonate of lime, Sunderland Cave.
58. Sandstone with malachite, Turner's Falls.
59. Variegated sandstone, Agawam River.
60. Variegated sandstone, Turner's Falls.
61. Variegated sandstone, South Hadley Falls.
62. Red jointed shale, Turner's Falls.
63. Red jointed shale, Turner's Falls.
64. Reddish sandstone, Titan's Pier.
65. Reddish sandstone, above shale, Turner's Falls.
66. Reddish sandstone, above shale, Turner's Falls.
67. Reddish sandstone, South Hadley Falls.
68. Reddish sandstone, South Hadley Falls.
69. Reddish sandstone, South Hadley Falls.
70. Shale breaking into cuneiform masses, Turner's Falls.
71. Hard gray micaceous shale, Turner's Falls.
72. Yellow decomposing sandstone, Amherst.
73. Black sandstone, South Hadley Falls.
74. Black sandstone, South Hadley Falls.

75. Black sandstone, West Springfield.
76. Bituminous marlite, West Springfield.
77. Bituminous marlite, West Springfield.
78. Bituminous marlite, West Springfield.
79. Bituminous marlite, Sunderland.
80. Variegated marlite, West Springfield.
81. Glazed marlite, West Springfield.
82. Fetid limestone, Paine's quarry, West Springfield.
83. Fetid limestone, Paine's quarry, West Springfield.
84. Hard fetid limestone, Paine's quarry, West Springfield.
85. Hard fetid limestone, Paine's quarry, West Springfield.
86. Limestone, Meacham's quarry, Holyoke.
87. Argillo-ferruginous limestone, Agawam River.
88. Tripoli, Paine's quarry, West Springfield.
89. Tripoli, Paine's quarry, West Springfield.
90. Tripoli, Paine's quarry, West Springfield.
91. Tripoli, Holyoke.
92. Tripoli, Holyoke.
93. Septaria, West Springfield.
94. Septaria, West Springfield.
95. Septaria, West Springfield.
96. Septaria, West Springfield.
97. Concreted carbonate of lime, Mount Mettawampe.
98. Concreted carbonate of lime, Mount Mettawampe.
99. Concreted carbonate of lime, Sunderland Cave.
100. Concreted carbonate of lime, West Springfield.
101. Stalactical limestone, Sunderland Cave.
102. Veins of calcite in black slate, West Springfield.
103. Satin spar in seams, West Springfield.
104. Satin spar in seams, West Springfield.
105. Satin spar in seams, West Springfield.
106. Heavy spar, Greenfield.
107. Celestine, Meacham's quarry, Holyoke.
108. Bituminous coal, West Springfield.
109. Bituminous coal with blende, West Springfield.
110. Blende and galena in limestone, West Springfield.
111. Chalybite, Turner's Falls.
112. Chalybite, South Hadley Falls.
113. Iron sand, Turner's Falls.
114. Copper glance, Simsbury, Connecticut.
115. Copper pyrites, Turner's Falls.
116. Green malachite, Greenfield.
117. Bituminous coal, South Hadley.
118. Bituminous coal, South Hadley Falls.
119. Anasphaltic coal, Turner's Falls.
120. Fluor spar, incrustation, West Springfield.
121. Fossil plant, North Sunderland.

122. Fossil plant, North Sunderland.
123. Fossil plant, North Sunderland.
124. Fossil plant, North Sunderland.
125. Fossil plant, North Sunderland.
126. Fossil plant, West Springfield.
127. Fossil plant, Sunderland.
128. Fossil plant, (?) Deerfield.
129. Fossil plant, (?) Deerfield.
130. Fossil plant, Greenfield.
131. Fossil plant, Deerfield.
132. Fossil plant, Deerfield.
133. Encrinite, (?) West Springfield.
134. Encrinite, (?) West Springfield.
135. Ripple marks and concretions, West Springfield. (See figure 100.)
136. Ripple marks and concretions, West Springfield.
137. Ripple marks and concretions without reticulations. West Springfield.
138. Zoophyte (?) changed into chert, West Springfield.
139. Concretion in limestone, West Springfield.
140. Concretion in limestone, West Springfield.
141. Concretion in limestone, West Springfield.
142. Concretion in limestone, West Springfield.
143. Concretion in limestone, West Springfield.
144. Concretion in limestone, West Springfield.
145. Concretion in limestone, West Springfield.
146. Concretion in limestone, West Springfield.
147. Concretion in limestone, West Springfield.
148. Concretion in limestone, West Springfield.
149. Eurynotus tenuiceps Agass. Sunderland. (Plate 29. figure 1.)
150. Eurynotus tenuiceps Agass. Sunderland.
151. Ichthyolites, Sunderland.
152. Fragments of ichthyolites, Sunderland.
153. Concretion in shale, Turner's Falls.
154. Moulds of organisms, South Hadley Falls.
155. Veins of clay, South Hadley Falls.
156. Gray conglomerate, (boulder,) Amherst.
157. Variegated conglomerate, Southwick.
158. Variegated conglomerate, Southwick.
159. Variegated conglomerate, Westfield.
160. Reddish sandstone, Westfield.
161. Variegated sandstone, Westfield.
162. Conglomerate, (boulder,) Belchertown.
163. Conglomerate, Granby.
164. Red sandstone, Wilbraham.
165. Red sandstone, Wilbraham.
166. Striped sandstone, Springfield.
167. Traft tuff, (?) Mount Holyoke.
168. Black shale, Montague.

169. Gray sandstone, Agawam River.
170. Calcite, lenticular, West Springfield.
171. Striped sandstone, Rocky Hill, Connecticut.
172. Sandstone hardened by trap, Rocky Hill, Connecticut.
173. Gray sandstones, hardened by trap, Rocky Hill, Connecticut.
174. Arragonite, Wilbraham.
175. Fossil plants, Wilbraham.
176. Fossil plants, Wilbraham.
177. Fossil plants, Wilbraham.
178. Striped sandstone, Agawam River.
179. Micaceous sandstone, Agawam River.
180. Vesicular sandstone, West Springfield.
181. Compact fetid limestone, Chicopee Falls.
182. Compact fetid limestone, Agawam River.
183. Argillaceous limestone, Agawam River.
184. Septaria, Agawam River.
185. Branching septaria, Chicopee Falls.
186. Reniform septaria, Agawam River.
187. Septaria, Cabotville.
188. Septaria, Chicopee Falls.
189. Small septaria, Agawam River.
190. Bituminous coal, Mitteaneague Falls.
191. Bituminous coal with calcite, Mitineaque Falls.
192. Bituminous coal with calcite, Mitineaque Falls.
193. Decomposing shale, Montague.
194. Reddish satin spar, West Springfield.
195. White satin spar, West Springfield.
196. Dicotyledons with Icthyolites, Sunderland.
197. Dicotyledons with Icthyolites, Northampton.
198. Stem of a plant on shale, Chicopee Falls.
199. Fragments of vegetables, South Hadley, north part.
200. Vegetable relics on red shale, Wethersfield, Connecticut. (See Plate 28, figure 3.)
201. Large stems on shale, Sunderland.
202. Vegetable relics and perhaps Echini, Wethersfield, Connecticut.
203. Vegetable remains, South Hadley Canal. (See Plate 28, figure 5.)
204. Vegetable remains, (boulder,) Amherst.
205. Fucoid, Suffield, Connecticut. (See figure 92.)
206. Vegetable stem converted into copper ore, Suffield, Connecticut.
207. Vegetable stem with Ichnolites, Chicopee Falls. (See figure 89.)
208. Unknown plant, Northampton.
209. Unknown plant, Northampton.
210. Unknown plant, Wethersfield, Connecticut.
211. Mud veins with plants, Cabotville.
212. Mud veins with plants, Cabotville.
213. Mud veins in relief, South Hadley.
214. Unknown relic, Chicopee Falls. (See figure 93.)

215. Unknown relic, Wilbraham.
216. Unknown relic, Sunderland. (See figure 94.)
217. Unknown relic, Wethersfield, Connecticut.
218. Micaceous sandstone with concretions, South Hadley.
219. Unknown animal relic, Wethersfield, Connecticut. (See figure 98.)
220. Unknown animal relic, Montague, south-west part.
221. Icthyolites, (Eurynotus — Agas) Sunderland.
222. Animal relic, Sunderland. (See figure 99.)
223. Brontozoum exsertum in relief, Turner's Falls, Montague. (Plate 37, figure 20, 21. Plate 28, figure 22.)
224. Brontozoum exsertum in relief, Wethersfield, Connecticut. (Plate 38, figure 23. Plate 39, figure 24. Plate 44, figure 36, 37.)
225. Brontozoum validum, Cabotville.
226. Platypterna Deaniana, two tracks, Wethersfield, Connecticut. (Plate 42, figure 31. Plate 32, figure 42.)
227. Platypterna Deaniana and P. tenuis, Wethersfield, Connecticut.
228. Ornithopus gracilior and Cheirotheroides pilulatus, Wethersfield, Connecticut. (Plate 46, figure 43)
229. Ornithopus gallinaceus, Cabotville. (Plate 46, figure 42.)
230. Triaenopus leptodactylus, Wethersfield, Connecticut.
231. Plectropterna minitans, Wethersfield, Connecticut. (Plate 33, figure 10, 12. Plate 48, figure 48.)
232. Plectropterna minitans, Chicopee Falls.
233. Polemarchus gigas, Chicopee Falls. (Plate 35, figure 17.)
234. Tridentipes elegans, Montague. (Plate 41, figure 28.)
235. Tridentipes elegantior, Montague. (Plate 42, figure 30)
236. Tridentipes elegans and Plectropterna minitans, Wethersfield, Connecticut.
237. Triaenopus leptodactylus, Wethersfield, Connecticut. (Plate 30, figure 4. Plate 31, figures 5, 6, 7.)
238. Triaenopus leptodactylus, Wethersfield, Connecticut.
239. Argozoum pari-digitatum, Horse Race, Gill. (Plate 45, figures 38, 39.)
240. Cheirotheroides pilulatus, Wethersfield, Connecticut. (Plate 45, figure 41. Plate 42, figure 30.)
241. Gray sandstone, at the artesian well, South Hadley.
242. Gray sandstone, at the artesian well, South Hadley.
243. Soft striped shale, railroad cut, West Springfield, west part.
244. Water limestone, Agawam River.
245. Ripple marks, Horse Race, Gill.
246. Ripple marks, Wethersfield, Connecticut.
247. Ripple marks, Wethersfield, Connecticut. (See figure 88.)
248. Ripple marks, finer, Wethersfield, Connecticut.
249. Ripple marks, very small, Wethersfield, Connecticut.
250. Impressions of raindrops, Wethersfield, Connecticut.
251. Impressions of raindrops, less distinct, Wethersfield, Connecticut. (See Plate 49, figure 65.)
252. Impressions of raindrops, much enlarged, Wethersfield, Connecticut.

253. Impressions of raindrops, much more spread, Wethersfield, Connecticut.
254. Impressions of raindrops, with fine ripple marks, Wethersfield, Connecticut.
255. Partial concretion, Wethersfield, Connecticut.
256. Partial concretion, Wethersfield, Connecticut.
257. Brontozoum giganteum, in relief, Northampton.
258. Cast of Brontozoum giganteum. Original specimen from Wethersfield, Connecticut.
259. Cast of Tridentipes elegans, from Gill.
260. Mould of Polemarchus gigas.
261. Cast of Brontozoum exsertum.
262. Cast of Brontozoum exsertum.
263. Mould of Brontozoum exsertum.
264. Mould of Brontozoum validum.
265. Cast of a row of Grallator cuneatus, from South Hadley. (Plate 39, figure 25.)
266. Cast of Anisopus Deweyanus. (Plate 39, figure 26.)
267. Cast of Chimaera barrattii.
268. Mould of Ancyropus heteroclitus. (Plate 30, fig. 2. Plate 34, fig. 14.)
269. Mould of Ancyropus heteroclitus.
270. Mould of Harpedactylus gracilis. (Plate 34, figure 13.)
271. Mould of Triaenopus leptodactylus.
272. Cast of a double track of Triaenopus leptodactylus.
273. Cast of Macropterna divaricans. (?) (Plate 34, figures 15, 16.)
274. Mould of Plectropterna minitans.
275. Triaenopus leptodactylus, (Mould)
276. Triaenopus leptodactylus, (Mould.)
277. Mould of a small slab of tracks.
278. Mould of Argozoum dispari-digitatum.
279. Mould of Tridentipes elegans.
280. Mould of Tridentipes elegans.
281. Cast of Platypterna Deaniana.
282. Cast of Platypterna Deaniana.
283. Cast of Platypterna Deaniana.
284. Cast of Platypterna Deaniana.
285. Cast of Ornithopus gallinaceus.
286. Cast of Platypterna tenuis. (Plate 43, figures 33, 34.)
287. Cast of Argozoum pari-digitatum.
288. Cast of Platypterna delicatula. (Plate 45, figure 40.)
289. Cast of two tracks of Cheirotheroides pilulatus.
290. Variegated sandstone, Westfield.
291. Variegated sandstone, Westfield.
292. Variegated sandstone, Westfield.
293. Fucoides, Greenfield.
294. Clathropteris rectiusculus. E. Hitchcock, Jr., Mount Tom, Easthampton.
295. Clathropteris rectiusculus. E. Hitchcock, Jr., Mount Tom, Easthampton.
296. Fucoid changed to limestone, Springfield, Water Shops.
297. Batrachoides nidificans, mud nests of tadpoles, South Hadley Canal.

VI. Carboniferous Rocks, Common and Metamorphic.

1. Conglomerate, the variety most common, Dorchester.
2. Conglomerate, Swanzey.
3. Conglomerate, with a vein of quartz, Brookline.
4. Conglomerate, with a vein of quartz, Attleborough.
5. Conglomerate, with a vein of quartz, reddish, Roxbury.
6. Argillaceous slate, coal mine, Portsmouth.
7. Cubical pyrites in anthacitous slate, Wrentham coal mine.
8. Impressions of ferns, &c., on slate, Newport, Rhode Island.
9. Sphaenophyllum, (?) on slate, Newport, Rhode Island.
10. Unknown impressions, on slate, Newport, Rhode Island.
11. Calamites, Wrentham, coal mine.
12. Neuropteris, (?) Wrentham, coal mine.
13. Relic on hard schistose rock, Attleborough.
14. Anthracite, Wrentham.
15. Anthracite, Portsmouth, Rhode Island.
16. Conglomerate, nodules mostly quartz, Berkley.
17. Conglomerate, nodules, Dighton.
18. Conglomerate, calcareous, Mansfield.
19. Conglomerate, Roxbury.
20. Conglomerate, Walpole.
21. Conglomerate, (boulder,) Hancock.
22. Conglomerate, West Newton.
23. Conglomerate, Fall River.
24. Conglomerate, fine, (boulder,) West Hancock.
25. Conglomerate, Swanzey.
26. Conglomerate, Walpole.
27. Coal measures, Mansfield.
28. Prase, coal mine, Cumberland, Rhode Island.
29. Calcite, Mansfield.
30. Gray grit, with Anthracite, Abington.
31. Shale with fossil, Cumberland, Rhode Island.
32. Shale, glazed, Cumberland, Rhode Island.
33. Anthracite, Cumberland, Rhode Island.
34. Anthracite, Cumberland, Rhode Island.
35. Shale, glazed, Mansfield.
36. Shale, Hardon mine, Mansfield.
37. Anthracite, Hardon mine, Mansfield.
38. Anthracite, wading vein, Hardon mine, Mansfield.
39. Anthracite, Foxborough.
40. Glazed shale, Mansfield.
41. Calamites, cylindrical, Wrentham. (See Plate 24, figure 3. Plate 27, figures 2, 3.)
42. Calamites, flattened, Wrentham.
43. Calamites, flattened, Wrentham.
44. Calamites, flattened, Wrentham.
45. Stigmaria, with depression on one side, Wrentham.

46. Stigmaria, with central axis, Mansfield.
47. Monocotyledon, (?) upper part of leaf, Hardon mine, Mansfield.
48. Monocotyledon, (?) upper part of leaf, Mansfield.
49. Monocotyledon, (?) central part of leaf, Mansfield.
50. Flattened stem, pointed, Wrentham, south part.
51. Large fern, Mansfield. (Plate 23.)
52. Neuropteris, Wrentham. (See Plate 21, figure 1. Plate 22, figure 4. Plate 27, figure 4.)
53. Sphenopteris, Hardon mine, Mansfield. (See Plate 21, figure 1. Plate 27, figure 1.)
54. Neuropteris, Hardon mine, Mansfield.
55. Fern, Hardon mine, Mansfield.
56. Pachypteris (?) or Odontopteris, (?) Mansfield. (See Plate 22, figure 3. Plate 23.)
57. Small reeds, Wrentham.
58. Small reeds and Sphaenophyllum, Hardon mine, Mansfield.
59. Pecopteris and Sphaenophyllum emarginatum (?) Mansfield. (See Plate 22, figure 2.)
60. Sphenopteris, Mansfield.
61. Asterophyllites, &c., Mansfield.
62. Annularia, Mansfield. (Plate 22, figure 3.)
63. Asterophyllites or Equisetum, Mansfield. (Plate 21, figure 2. Plate 22, figure 1.)
64. Arenaceous mica slate, Worcester.
65. Arenaceous mica slate, anthracite locality, Worcester.
66. Arenaceous mica slate, anthracite locality, Worcester.
67. Arenaceous mica slate with talcose aspect, Worcester.
68. Arenaceous mica slate with talcose aspect, Worcester.
69. Arenaceous mica slate with talcose aspect, Worcester.
70. Arenaceous mica slate with talcose aspect, Worcester.
71. Arenaceous mica slate with granite veins, Lunenburg.
72. Arenaceous mica slate, mostly quartz, Groton.
73. Arenaceous mica slate, mostly quartz, Groton.
74. Talco-arenaceous slate, (boulder,) Worcester.
75. Arenaceous mica slate, Dracut.
76. Arenaceous mica slate passing into clay slate, Worcester.
77. Arenaceous mica slate, talcose, Lowell.
78. Arenaceous mica slate, Methuen.
79. Arenaceous mica slate, mostly quartz, Worcester.
80. Arenaceous mica slate, Andover bridge.
81. Arenaceous mica slate with veins of quartz, Worcester.
82. Arenaceous mica slate, South Hampton, New Hampshire.
83. Arenaceous mica slate, East Sudbury.
84. Arenaceous mica slate, Webster.
85. Arenaceous mica slate, Oxford.
86. Plumbaginous mica slate, contorted, Worcester.
87. Plumbaginous mica slate, Ward.

88. Plumbaginous mica slate, Amesbury.
89. Brecciated mica slate, Amesbury.
90. Anthracitous mica slate, Dudley.
91. Anthracitous mica slate, anthracite locality, Worcester.
92. Anthracitous mica slate, anthracite locality, Worcester.
93. Anthracite, Worcester.
94. Anthracite, passing into plumbago, Worcester.
95. Amianthus, Worcester.
96. Bucholzite, Worcester.

VII. Devonian or Old Red Sandstone Rocks.

1. Conglomerate, red, Attleborough.
2. Conglomerate, quartzose brecciated, Attleborough.
3. Old red sandstone, red from oxide of iron, Attleborough.
4. Old red sandstone, red from oxide of iron, Wrentham.
5. Old red sandstone, chocolate color, Rehoboth.
6. Old red sandstone, chocolate color, Walpole.
7. Old red sandstone, chocolate color, Abington.
8. Old red sandstone, chocolate color, Canton.
9. Old red sandstone, chocolate color, slaty, Wrentham.
10. Old red sandstone, with veins of white quartz, Wrentham.
11. Old red sandstone, red, Greenbush, New York.
12. Gray grit, Rehoboth.
13. Gray grit, reddish, Rehoboth.
14. Gray grit, red, Attleborough.
15. Gray slate, deep red, Attleborough.
16. Gray slate, deep red, Attleborough.
17. Conglomerate, Attleborough, south-west part.
18. Conglomerate, Attleborough, south-west part.
19. Slaty sandstone, Attleborough, south-west part.
20. Slaty sandstone, Wrentham.
21. Compact limestone, Attleborough.
22. Compact limestone, with slate, Attleborough.
23. Fossiliferous limestone, Bernardston.
24. Fossiliferous limestone, Bernardston.
25. Limestone brecciated, (polished,) Bernardston.
26. Encrinites, Bernardston.
27. Encrinites, Bernardston.
28. Encrinites, Bernardston.

VIII. Silurian and Cambrian Rocks. (Metamorphic.)

1. Macle in argillaceous slate, (boulder,) Worcester.
2. Common argillaceous slate, Guilford, Vermont.
3. Common argillaceous slate, Lancaster.
4. Common argillaceous slate, Shirley.
5. Common argillaceous slate, Harvard.
6. Common argillaceous slate, Pepperell.
7. Common argillaceous slate, passing into mica slate, Bernardston.

8. Common argillaceous slate, with quartz veins, Guilford, Vermont.
9. Common argillaceous slate, with quartz veins, Guilford, Vermont.
10. Common argillaceous slate, wavy surface, glen at Leyden.
11. Common argillaceous slate, contorted, Guilford, Vermont.
12. Common argillaceous slate, contorted, Guilford, Vermont.
13. Micacco-argillaceous slate, *en echellon*, glen at Leyden.
14. Argillaceous slate, much bent, Guilford, Vermont.
15. Argillaceous slate, much bent, Guilford, Vermont.
16. Argillaceous slate, exhibiting a double flexure, Guilford, Vermont.
17. Argillaceous slate, red, Sand Lake, New York.
18. Argillaceous slate, gray beneath limestone, Chatham, New York.
19. Argillaceous slate, epidotic, Hancock.
20. Chlorite slate, Guilford, Vermont.
21. Chlorite slate, passing into novaculite, Guilford, Vermont.
22. Chlorite slate, passing into novaculite, Guilford, Vermont.
23. Chiastolite in argillaceous slate, Lancaster.
24. A card of macles, Lancaster.
25. Clay slate, quarry, Harvard.
26. Clay slate, jointed, Lancaster.
27. Clay slate, jointed, Lancaster.
28. Clay slate, with a vein of granite, Harvard.
29. Clay slate, Groton.
30. Clay slate, Groton.
31. Gray conglomerate, Natick.
32. Conglomerate nodules, chiefly mica slate, Bradford.
33. Conglomerate nodules, fine mica slate or quartz rock containing mag. oxide iron, Middletown, Rhode Island.
34. Breccia, fragments of slate reunited, Natick.
35. Breccia, fragments of slate reunited, Randolph.
36. Breccia, fine, fragments of slate reunited, Natick.
37. Breccia, somewhat rounded, slaty, Dorchester.
38. Breccia, somewhat rounded, slaty, Canton.
39. Gray grit, (boulder,) Hull.
40. Gray grit, Newton.
41. Gray grit, with veins of quartz, Pawtucket.
42. Gray grit, with veins of quartz, Stephentown, New York.
43. Gray grit, with veins of quartz, Attleborough.
44. Gray grit, Rehoboth.
45. Gray grit, Newton.
46. Gray grit, Watertown.
47. Gray grit, Pawtucket.
48. Gray grit, light, Newbury.
49. Gray grit, glazed, Newport, Rhode Island.
50. Gray grit, glazed, Watertown.
51. Gray grit, Natick.
52. Gray grit, epidotic, Newton.
53. Gray grit, Taunton.

54. Gray grit, Attleborough.
55. Gray grit, reddish, Newbury.
56. Gray grit, reddish, with quartz veins, Pawtucket.
57. Gray grit, reddish, divided by joints, Wrentham.
58. Gray grit, reddish, divided by joints, Pawtucket.
59. Gray grit, reddish, variegated, Newbury.
60. Gray grit, reddish, Milton.
61. Gray grit, red, Kent's Island, Newbury.
62. Gray grit, reddish, variegated, Hull.
63. Gray grit, Nassau, New York.
64. Gray grit, Nassau, New York.
65. Novaculite, Charlestown.
66. Argillaceous slate variegated, Charlestown.
67. Argillaceous slate, rhomboidal, Rainsford Island.
68. Argillaceous slate, rhomboidal, South Boston.
69. Argillaceous slate, laminæ curved, Rainsford Island.
70. Argillaceous slate, light gray, Halifax.
71. Argillaceous slate, with veins of calcite, Watertown.
72. Argillaceous slate, variegated, Quincy.
73. Argillaceous slate, Hull.
74. Argillaceous slate, (Novaculite,) Boston Light House.
75. Argillaceous slate, (Novaculite,) Hingham.
76. Argillaceous slate, (Novaculite,) Spring Street, Roxbury.
77. Argillaceous slate, (Novaculite,) Watertown.
78. Rock from a vein in granite, lead mine, Easton.
79. Prase, with asbestos, Brighton.
80. Slaty rock, reddish, Roxbury.
81. Slaty rock, with quartz veins, Attleborough.
82. Slaty rock, wedged between masses of sienite, Middleborough.
83. Slaty rock, chiefly slaty compact feldspar, Plympton.
84. Conglomerate, gray, (boulder,) Rochester.
85. Gray grit, Hanover Four Corners.
86. Gray grit, slaty (boulder,) Middleborough.
87. Gray grit, with viens of amianthus, Dorchester.
88. Petalite, in limestone, Attleborough.
89. Gray grit, Inscription rock, Asonet, Berkley.
90. Conglomerate, fragments of compact feldspar, cement indurated clay, Saugus.
91. Breccia, fragments of compact feldspar united, Nantasket Beach.
92. Slaty aggregate of quartz and mica, Middletown, Rhode Island.
93. Slaty aggregate of quartz and mica, Middletown, Rhode Island.
94. Slaty aggregate of quartz and mica, with argillaceous matter, Fall River.
95. Slaty aggregate of quartz and mica with argillaceous matter, Fall River.
96. Slaty quartz, passing into mica slate, Fall River.
97. Talcose slate, Randolph.
98. Talcose aggregate, conglomerated, Canton.
99. Talcose aggregate, conglomerated, Cambridge.

100. Talcose aggregate, conglomerated, Walpole.
101. Talcose aggregate, conglomerated, Newbury.
102. Amphibolic aggregate, Middletown, Rhode Island.
103. Varioloid rock, Saugus.
104. Varioloid rock, Brighton.
105. Varioloid rock, Hingham.
106. Varioloid rock, Nantasket Beach.
107. Varioloid rock, Hingham.
108. Varioloid nodules quartz and epidote, Brighton.
109. Varioloid rock, approaching porphyry, Needham.
110. Amygdaloid, passing into siliceous slate, Newport, Rhode Island.
111. Siliceous slate, porphyritic, Newport, Rhode Island.
112. Siliceous slate, porphyritic, Newport, Rhode Island.
113. Siliceous slate, with veins of granite, Newport, Rhode Island.
114. Siliceous slate, with veins of granite, Nahant.
115. Siliceous slate, with veins of granite, Nahant.
116. Siliceous slate, passing into chert, Nahant.
117. Jasper, Newport, Rhode Island.
118. Heliotrope, Newport, Rhode Island.
119. Clouded jasper, (compact feldspar ?) Saugus.
120. Metamorphic slates, Duxbury.
121. Metamorphic slates, Duxbury.
122. Jasper, (red compact feldspar,) Saugus.
123. Jasper, (red compact feldspar,) Saugus.
124. Zoisite, in amphibolic aggregate, Middletown, Rhode Island.
125. Breccia, fragments porphyry, Nantasket Beach.
126. Metamorphic slate passing into trap, Kent's Island, Newbury.
127. Metamorphic slate passing into trap, Kent's Island, Newbury.
128. Quartzose reddish slate, Kent's Island, Newbury.
129. Talcose slate, quartz in grains, Wrentham, south part.
130. Slaty porphyry, somewhat mechanical, South Natick.
131. Varioloid rock, South Natick.
132. Varioloid rock, Hingham.
133. Conglomerated clay slate, Slate Quarry, Harvard,
134. Conglomerated clay slate, Slate Quarry, Harvard.
135. Conglomerated clay slate, Slate Quarry, Harvard,
136. Conglomerated clay slate, Slate Quarry, Harvard.
137. Conglomerated mica slate, Bellingham.
138. Conglomerated mica slate, Bellingham.
139. Conglomerated mica slate, Bellingham.
140. Mica slate, associated with last three numbers.
141. Junction of the mica slate and conglomerate, Bellingham.
142. Spangled mica slate associated with the conglomerate, Bellingham.
143. Conglomerated mica slate, Wickford, Rhode Island.
144. Conglomerated mica slate, Wickford, Rhode Island.
145. Mica slate associated with conglomerate, Wrentham, south part.
146. Bastard mica slate, brecciated, Wrentham.

147. Aggregate of quartz and mica, Fall River.
148. Aggregate of quartz and mica, Fall River.
149. Metamorphic rock, head of Nantasket Beach.
150. Metamorphic rock, head of Nantasket Beach.
151. Metamorphic rock, Duxbury.
152. Gray slate passing into hornstone, Weston, north part.
153. Hornstone, with a slaty structure, Weston, north part.
154. Hornstone, with a slaty structure, Weston, north part.
155. Mica slate, (whetstone slate,) Bellingham, north-east part.
156. Mica slate, (whetstone slate,) Bellingham, north-east part.
157. Mica slate, (whetstone slate,) Bellingham, north-east part.
158. Mica slate, (whetstone slate,) Belingham, north-east part.
159. Mica slate, whetstone quarry, Smithfield, Rhode Island.
160. Varioloid rock, North Scituate.
161. Varioloid rock, North Scituate.
162. Varioloid rock, North Scituate.
163. Varioloid rock, North Scituate.
164. Varioloid rock, North Scituate.
165. Varioloid rock, North Scituate.
166. Metamorphic conglomerate, North Scituate.
167. Metamorphic conglomerate, North Scituate.

IX. LIMESTONE.—(*Metamorphic and crystalline.*)

1. White polished marble, Adams.
2. White polished marble, Adams.
3. White marble, West Stockbridge.
4. White marble, West Stockbridge.
5. White marble, Lanesborough.
6. White marble, New Ashford.
7. White marble, New Ashford.
8. White saccharine limestone, (boulder,) Peru.
9. Granular white dolomite, Sheffield.
10. Gray polished marble, Lanesborough.
11. Gray polished marble, West Stockbridge.
12. Gray clouded marble, (polished,) New Ashford.
13. Gray clouded marble, (polished,) New Ashford.
14. Gray clouded marble, (polished,) West Stockbridge.
15. Dove colored clouded marble, (polished,) Great Barrington.
16. Gray limestone, Sheffield.
17. Gray limestone, Lee.
18. Gray limestone nearly compact, Lanesborough.
19. Gray limestone nearly compact, West Stockbridge.
20. Light gray limestone, Pittsfield.
21. Dark gray limestone, nearly compact, Williamstown.
22. Dark gray limestone, Stephentown, New York.
23. Dark gray limestone, Stephentown, New York.
24. Dark gray limestone, Canaan, New York.

25. Compact limestone with veins of calcite, Chatham, New York.
26. Limestone with quartz veins, Chatham, New York.
27. Yellowish coarse limestone with a foreign mineral, Stockbridge.
28. Micaceous limestone, Stockbridge.
29. Micaceous limestone with mica and quartz, Canaan, Connecticut.
30. Micaceous limestone with mica and quartz, Lanesborough.
31. Micaceous limestone with mica and quartz, South Lee.
32. Micaceous limestone with mica and quartz, Whately.
33. Micaceous limestone with mica and quartz, Colrain.
34. Micaceous limestone with mica and quartz, Conway.
35. Micaceous limestone with mica and quartz, Heath.
36. Micaceous limestone with mica and quartz, Southampton.
37. Micaceous limestone, with veins of quartz and calcite, Conway.
38. Micaceous limestone, with veins of granite, Colrain.
39. Micaceous limestone, with veins of argentine, Northampton.
40. Micaceous limestone decomposed at the surface, Guilford, Vermont.
41. Gray limestone in mica slate, (boulders,) Williamsburgh.
42. Gray limestone in mica slate, (boulders,) Williamsburgh.
43. Coarse white limestone with graphite, (boulder,) Blandford.
44. Coarse white limestone, Whitingham, Vermont.
45. Coarse white limestone, Whitingham, Vermont.
46. Coarse white limestone, Whitingham, Vermont.
47. Coarse white micaceous limestone, Whitingham, Vermont.
48. Coarse white micaceous limestone with chlorite, (boulder,) Conway, originally from Whitingham, Vermont.
49. Dolomitic limestone, Somerset, Vermont.
50. Dolomitic limestone, Somerset, Vermont.
51. Fine granular limestome, Somerset, Vermont.
52. White crystaline fetid limestone, Bolton.
53. Petalite, Bolton.
54. Magnesian limestone, Boxborough.
55. Magnesian limestone, Boxborough.
56. Magnesian limestone, with serpentine, Littleton.
57. Magnesian limestone, with serpentine, Littleton.
58. Coarse granular whitish limestone, Chelmsford.
59. Coarse granular whitish limestone, Chelmsford.
60. Coarse granular whitish limestone, Acton.
61. Gray coarse granular limestone, Walpole.
62. Compact light gray limestone, Newport, Rhode Island.
63. Compact white translucent marble, (polished,) Stoneham.
64. Granular clouded limestone, Smithfield, Rhode Island.
65. White granular limestone, Harris rock, Smithfield, Rhode, Island.
66. White granular limestone, Dexter rock, Smithfield, Rhode Island.
67. Flesh colored limestone, Dexter rock, Smithfield, Rhode Island.
68. Flexible marble, New Ashford.
69. Laminated calcite, Bernardston.
70. Crystalized calcite, Bernardston.

71. Hydrate of iron, Bernardston.
72. Magnetic oxide of iron, Bernardston.
73. Nephrite, Stoneham.
74. Allochroite, Stoneham.
75. Specks of Serpentine in limestone, Boxborough.
76. Augite in calcite, Boxborough.
77. Calcite, wine yellow, Boxborough.
78. Actinolite in limestone, Boxborough.
79. Radiated actinolite, Boxborough.
80. Compact purple scapolite, Boxborough.
81. Lilac scapolite, Bolton.
82. Crystals of lilac scapolite, Bolton.
83. Dark gray scapolite, (nuttallite,) Bolton.
84. Sahlite, Bolton.
85. Sahlite with compact scapolite, Acton.
86. Diopside, Whitingham, Vermont.
87. Actinolite, Chelmsford.
88. Boltonite, Bolton.
89. Boltonite, Bolton.
90. White amianthus, Chelmsford.
91. White amianthus, Chelmsford.
92. Limestone and white talc, Smithfield, Rhode Island.
93. Augite, scapolite and cinnamonstone, Carlisle.
94. Cinnamonstone and pargasite, Carlilse.
95. Cinnamonstone and pargasite, Carlisle.
96. Crystallized scapolite, Littleton.
97. Actinolite, Littleton.
98. Apatite in scapolite, Littleton.
99. Sphene with scapolite and petalite, Bolton.
100. Sphene with scapolite and petalite, Littleton.
101. Sphene with scapolite and augite, Carlisle.
102. White crystallized augite in dolomite, Canaan, Connecticut.
103. Calcite and augite, Lee.
104. Tremolite in dolomite, Lee.
105. Tremolite in dolomite, Canaan, Connecticut.
106. Tremolite in dolomite, Sheffield.
107. Bisilicate of lime and trisilicate of alumina, (scapolite rock,) Canaan Connecticut.
108. Compact bisilicate of lime and scapolite rock, Canaan, Connecticut.
109. Bisilicate of lime, scapolite rock and dolomite, Canaan, Connecticut.
110. Scapolite rock with mica, passing into mica slate, Canaan, Connecticut.
111. Scapolite with quartz and augite, Canaan, Connecticut.
112. Common marble, North Adams.
113. Common marble, North Adams.
114. Marble, Fitch's quarry, West Stockbridge.
115. Marble, Fitch's quarry, West Stockbridge.
116. Marble, West Stockbridge.

117. Marble, Sheffield.
118. Marble, Lanesborough.
119. Marble, Egremont.
120. Marble, Girard College quarry, Sheffield.
121. Marble, Boston Corner.
122. Marble, Boston Corner.
123. Sparry limestone, Lanesborough.
124. Sparry limestone, New Ashford.
125. Black limestone, Lanesborough.
126. Black limestone, (boulder,) Richmond.
127. Gray limestone, Hancock.
128. Reddish limestone, South Williamstown.
129. Gray limestone, Concord.
130. Gray limestone, Whately.
131. Gray limestone, Ashfield.
132. Gray limestone, Ashfield.
133. Gray limestone, Norwich.
134. Gray limestone, (boulder,) Royalston.
135. Compact gray limestone, Copake, New York.
136. Dolomite, South Tyringham.
137. Dolomite marble, Sheffield.
138. Dolomite, Smith's quarry, New Marlborough.
139. Dolomite, Smith's quarry, New Marlborough.
140. Dolomite, Hadsell's quarry, New Marlborough.
141. Dolomite, New Marlborough, south part.
142. Dolomite, Williamstown, south of college.
143. Dolomite, Tyringham, north-west part.
144. Dolomite, clouded marble, Great Barrington.
145. Dolomite, Hadsell's quarry, New Marlborough.
146. Dolomite, East Lanesborough.
147. Dolomite, north-west base of Saddle Mountain, Williamstown.
148. Dolomite, Lee, one mile west of village.
149. Dolomite, Lee, one mile west of village.
150. Dolomite, near church, Dalton.
151. Dolomite, east bed, Middlefield.
152. Dolomite, Cole's Brook, Middlefield.
153. Dolomite, Cole's Brook, Middlefield.
154. Dolomite, Becket, south-east part.
155. Dolomite, South Becket.
156. Dolomite, (boulder,) Sherburne.
157. Dolomite, (boulder,) East Bradford.
158. Dolomite, near railroad, Natick.
159. Dolomite, Natick Centre.
160. Dolomite, railroad cut, Natick.
161. Compact yellow limestone, dolomitic, railroad cut, Natick.
162. Compact yellow limestone, dolomitic, railroad cut, Natick.
163. Compact yellow limestone, dolomitic, railroad cut, Natick.

164. Compact white dolomitic limestone, Stoneham.
165. Variegated marble, east bed, Middlefield.
166. Verd antique marble, east bed, Middlefield.
167. Verd antique marble, east bed, Middlefield.
168. Gray slaty limestone, Copake, New York.
169. Gray slaty limestone, Lanesborough.
170. Gray slaty limestone, West Stockbridge.
171. Gray limestone, Smith's quarry, New Marlborough.
172. Micaceous limestone, Cheshire.
173. Limestone with yellow mica, east bed, Middlefield.
174. Junction of marble and mica slate, Fitch's quarry. West Stockbridge.
175. White micaceous limestone, east bed, Middlefield.
176. Talcose limestone, Becket.
177. Gray micaceous limestone, east bed, Middlefield.
178. Junction of limestone and talco-micaceous slate, Saddle Mountain, Williamstown.
179. Calcareous mica slate, Saddle Mountain, East Bridge, Adams.
180. Carbonate of lime and mica, West Stockbridge.
181. Carbonate of lime, mica and quartz, West Stockbridge.
182. Dolomite and feldspar, South Tyringham.
183. Dolomite, mica, quartz, &c., South Lee.
184. Limestone and augite, New Marlborough.
185. Micaceous limestone, decomposed, Pepperell.
186. Dolomite with white augite, Tyringham.
187. Dolomite with tremolite, Becket, south-east part.
188. Dolomite with tremolite, Lee.
189. Dolomite with tremolite, Lee.
190. Stalactite from cave, Lanesborough.
191. Carbonate of iron, Newbury.
192. Tremolite in limestone, Lenox.
193. Sphene in talcose limestone, Becket.
194. Sphene in talcose limestone, Adams.
195. Feldspar and quartz; a vein in limestone, Cole's brook, Middlefield.
196. Galena in limestone, gangue quartz, Alford.
197. Galena and pyrites, Alford.
198. Crystallized quartz in limestone, South Williamstown.
199. Carbonate of iron, Newbury.
200. Clouded flexible marble, Great Barrington.

X. Quartz Rock, (*Potsdam Sandstone in part.*)

1. White hyaline quartz, from mica slate, Heath.
2. White hyaline quartz, Plainfield.
3. Whitish quartz nearly opaque, Saddle Mountain.
4. Whitish quartz nearly opaque, from a vein in hornblende slate, Gill.
5. Whitish quartz containing argillaceous slate, Guilford, Vermont.
6. Fine granular white quartz, Cumberland, Rhode Island.
7. Reddish granular quartz, Berkshire county.

8. Reddish granular quartz, Cheshire.
9. Reddish granular quartz, Pittsfield.
10. Reddish granular quartz, Pittsfield.
11. Dark gray granular quartz, Windsor.
12. Arenaceous disintegrating quartz, Cheshire.
13. Arenaceous disintegrating quartz, Cheshire.
14. Granular striped quartz, Conway.
15. Hyaline dark smoky quartz, Amherst.
16. Smoky quartz in argillaceous slate, Guilford, Vermont.
17. Light smoky quartz in argillaceous slate, Sterling.
18. Reddish compact quartz, Leverett.
19. Reddish compact quartz, Prescott.
20. Bluish compact quartz, Amherst.
21. Greenish quartz, Cumberland, Rhode Island.
22. Porous quartz, (buhrstone,) Washington.
23. Arenaceous quartz with actinolite, associated with gneiss, Pelham.
24. Gray fine granular quartz, Cumberland, Rhode Island.
25. Gray fine granular quartz, Framingham.
26. Gray hyaline quartz with feldspar, Pelham.
27. Light gray granular quartz with small scales of mica, Lee.
28. Light gray granular quartz, stratified, (buhrstone locality,) Pittsfield.
29. Gray granular quartz with mica and contorted folia, Lee.
30. Gray hyaline quartz with mica, associated with gneiss, New Salem.
31. Brecciated parti-colored quartz with mica, Amherst.
32. Rhomboidal quartz with mica, Northfield.
33. Compact gray quartz with mica, Bernardston.
34. Compact gray quartz with mica, Bernardston.
35. Compact gray quartz with mica, Bernardston.
36. Quartz and talc, Webster.
37. Quartz and talc, Hawley.
38. Quartz and talc, Hawley.
39. Quartz with actinolite connected with gneiss, Pelham.
40. Quartz with hornblende, Hawley.
41. Argillaceous slate with quartz veins, South Hadley Canal.
42. Granular quartz and mica connected with gneiss, Windsor.
43. Granular quartz and mica connected with gneiss, Webster.
44. Granular quartz and mica associated with gneiss, Mendon.
45. Granular quartz and mica, Webster.
46. Granular quartz under the buhrstone, Pittsfield.
47. Granular quartz, Dalton.
48. Quartz mica and feldspar passing into gneiss, Bernardston.
49. Quartz and mica, Framingham.
50. Quartz and mica, Cumberland, Rhode Island.
51. Quartz and mica passing into mica slate, Zoar Bridge.
52. Arenaceous quartz and mica, Plainfield.
53. Quartz and mica, vesicular, Chesterfield.
54. Quartz and mica, Conway.

55. Quartz, mica and feldspar, passing into gneiss, Mendon.
56. Quartz with argillaceous slate near the lime bed, Bernardston.
57. Brecciated quartz, Leverett.
58. Brecciated quartz, Amherst.
59. Brecciated quartz, cement hematite, Dalton.
60. Brecciated quartz, cement hematite, Dalton.
61. Brecciated quartz, cement iron, Amherst.
62. Brecciated quartz and micaceous slate, Williamsburgh.
63. Quartzose conglomerate, (boulder,) cement mica slate, Windsor.
64. Quartzose conglomerate, Adams.
65. Quartz with disseminated iron pyrites, Windsor.
66. Ferruginous quartz, (boulder,) Worthington.
67. Quartz passing into yellow jasper, Chesterfield.
68. Quartz, Wendell.
69. Quartz vein, Roxbury.
70. Agatized quartz, New Rochester.
71. Agatized quartz, Middleborough.
72. Quartz, Athol.
73. Quartz, Granby, east part.
74. Granular quartz, Uxbridge.
75. Arenaceous quartz, Dalton.
76. Gray quartz, Williamstown.
77. Quartz, summit of Monument Mountain.
78. Quartz, Mountain east of Williamstown.
79. Red quartz, (boulder,) Franklin.
80. Rhomboidal quartz, Alum Hill, Sheffield.
81. Quartz, Bald Mountain, North Adams.
83. Quartz, Natick.
84. Firestone, East Douglass.
85. Quartz and hornblende, Warwick.
86. Quartz and hornblende, rhomboidal, Leverett.
87. Firestone, north part of Tyringham.
88. Rhomboidal quartz, Umpachena Falls, New Marlborough.
89. Firestone, Washington.
90. Slaty quartz, Alum Hill, Sheffield.
91. Quartz with veins of iron ore, mouth of Miller's River, Montague.
92. Quartz and mica, Palmer.
93. Contorted quartz and mica, Zoar.
94. Quartz, top of Beartown Mountain.
95. Quartz and mica, Palmer.
96. Quartz and mica, Millville, Mendon.
97. Arenaceous quartz and mica, Williamstown.
98. Quartz and mica, South Mountain, Northfield.
99. Quartz and mica, Railroad cut, Monson.
100. Quartz and mica, Washington, west part.
101. Quartz, mica, and feldspar, top of Beartown Mountain.
102. Quartz and mica overlying metamorphic slate, Bellingham, north-east part.

103. Quartz, mica, and feldspar, Beartown Mountain.
104. Conglomeritic quartz and mica, West Washington.
105. Conglomeritic quartz and mica, West Washington.
106 Quartzose breccia, cement hematite, (boulder,) Washington.
107. Quartzose breccia, cement hematite, (boulder,) Washington.
108. Quartzose breccia with tourmaline, east foot of Monument Mountain.
109. Quartzose breccia with tourmaline, Warwick.
110. Quartz with argentiferous galena, South Uxbridge.
111. Quartz with malachite, Williamstown.
112. Quartz with chlorite, (boulder,) South Middleborough.
113. Decomposing quartz rock, South Williamstown.
114. Quartz and mica, Millville, Mendon.
115. Jasper, rolled pebbles, North Adams.
116. Compact quartz, mouth of Miller's River, Montague.
117. Firestone, Pelham, west part.
118. Firestone with actinolite, Pelham, west part.

XI. Mica Slate, (*Metamorphic and Hypozoic.*)

1. Common mica slate, Colrain.
2. Mica slate, Peru.
3. Mica slate, Blandford.
4. Mica slate, Smithfield, Rhode Island.
5. Mica slate, Shelburne.
6. Mica slate, (Tunnel rock,) Florida.
7. Mica slate, Framingham.
8. Mica slate, Cheshire.
9. Fibrous mica slate, Northfield.
10. Fibrous mica slate, Northfield.
11. Fibrous mica slate, West Stockbridge.
12. Mica slate, very even and shining, Bolton, Connecticut.
13. Mica slate, layers tortuous, quartz tuberculous, Stockbridge.
14. Feldspathic mica slate, Pittsfield.
15. Feldspathic mica slate, Colrain.
16. Feldspathic mica slate, Westfield.
17. Feldspathic mica slate, Leverett.
18. Feldspathic mica slate, Montague.
19. Feldspathic mica slate, Granville.
20. Feldspathic mica slate, Granville.
21. Feldspathic mica slate, Florida.
22. Feldspathic mica slate, Ware.
23. Feldspathic mica slate, Mt. Wachusett, Princeton.
24. Feldspathic mica slate, Enfield.
25. Amphibolic garnetiferous mica slate, Norwich.
26. Mica slate with phosphate of lime, Conway.
27. Mica slate with phosphate of lime, Colrain.
28. Garnetiferous mica slate, Chesterfield.
29. Staurotidiferous mica slate, Chesterfield.

30. Spangled mica slate, Goshen.
31. Spangled mica slate, Plainfield.
32. Spangled mica slate, (jointed,) Plainfield.
33. Spangled mica slate, Norwich.
34. Argillo-micaceous slate, Goshen.
35. Argillo-micaceous slate, jointed, Greenfield.
36. Argillo-micaceous slate, rhomboidal, Greenfield.
37. Argillo-micaceous slate, Charlemont.
38. Argillo-micaceous slate, Hawley.
39. Argillo-micaceous slate, Heath.
40. Argillo-micaceous slate, Lanesborough.
41. Glazed argillo-mica slate with quartz, Glen, at Leyden.
42. Contorted argillo-micaceous slate, Guilford, Vermont.
43. Contorted argillo-micaceous slate, Hancock.
44. Argillo-micaceous slate with waved surface, Bradford.
45. Contorted argillo-micaceous slate with layers of quartz, Guilford, Vermont.
46. Contorted argillo-micaceous slate, Whately.
47. Contorted argillo-micaceous slate, Guilford, Vermont.
48. Contorted argillo-micaceous slate, Bernardston.
49. Contorted argillo-micaceous slate with layers of quartz, Williamstown.
50. Argillo-micaceous slate, Saddle Mountain.
51. Arenaceous mica slate, Norwich.
52. Arenaceous mica slate passing into gneiss, Bolton.
53. Arenaceous mica slate, argentine locality, Westhampton.
54. Arenaceous mica slate, Norwich.
55. Vesicular arenaceous mica slate, Chesterfield.
56. Vesicular arenaceous mica slate, Chester.
57. Vesicular arenaceous mica slate, Norwich.
58. Arenaceous mica slate, Woonsocket Falls, Cumberland, Rhode Island.
59. Arenaceous mica slate, Chester.
60. Arenaceous feldspathic mica slate, Enfield.
61. Arenacous mica slate, Chester.
62. Whetstone slate, Enfield.
63. Whetstone slate, Enfield.
64. Whetstone slate, Norwich.
65. Arenaceous mica slate, Sherburne.
66. Arenaceous mica slate, used for monuments, Halifax, Vermont.
67. Arenaceous mica slate, Greenfield.
68. Arenaceous mica slate, jointed, Deerfield.
69. Arenaceous mica slate, jointed, Deerfield.
70. Argillo-arenaceous slate, reddish, at junction with Connecticut River sandstone, Glen at Leyden.
71. Argillo-arenaceous slate, bent, Leyden glen.
72. Argillo-arenaceous slate, bent, Leyden glen.
73. Plumbaginous mica slate, Hawley.
74. Mica slate, common, Southampton.

75. Mica slate, Northfield, west of Connecticut River.
76. Mica slate, Conway.
77. Conglomerated mica slate passing into sienite, Whately.
78. Indurated mica slate, Whately.
79. Augite rock, associated with mica slate, Williamsburg.
80. Augite rock associated with mica slate, Williamsburg.
81. Phosphate of lime in mica slate, Norwich.
82. Fluor spar, Westmoreland, New Hampshire.
83. Milk quartz, Warwick.
84 Fetid hyaline quartz, Goshen.
85. Fetid quartz, crystallized, Williamsburg.
86. Rose red quartz, Blandford.
87. Rose red quartz, Blandford.
88. Rose red quartz, Chelmsford.
89. Yellow hyaline quartz, Colrain.
90. Blood red quartz, Colrain.
91. Quartzose breccia agate, Conway.
92. Quartzose breccia agate, Conway.
93. Quartzose breccia agate, Conway.
94. Quartzose breccia agate, Conway.
95. Quartzose breccia agate, Conway.
96. Quartzose breccia agate, Conway.
97. Quartzose breccia agate, Conway.
98. Quartzose breccia agate, Conway.
99. Quartzose breccia agate, Amherst.
100. Tabular quartz, Conway.
101. Tabular quartz, pseudomorphous, Con way.
102. Yellow quartz, Amherst.
103. Fibrolite in mica slate, Lancaster.
104. Kyanite and Apatite, Chesterfield.
105. Kyanite and Apatite, Chesterfield.
106. Kyanite and Apatite, Chesterfield.
107. Kyanite, Chester.
108. Staurotide in mica slate, Chesterfield.
109. Andalusite, Westford.
110. Andalusite, Westford.
111. Fibrous talc with andalusite, Westford.
112. Black tourmaline, Blandford.
113. Garnets in mica slate, Chesterfield.
114. Garnets in mica slate, Chesterfield.
115. Epidote in amphibolic mica slate, Goshen.
116. Epidote in amphibolic mica slate, Williamsburg.
117. Zoisite with specular iron and spathic iron, Goshen.
118. Zoisite, Chesterfield.
119. Idocrase, epidote, calcite, &c., Worcester.
120. Anthophyllite in mica slate, Chesterfield.
121. Anthophyllite, Blandford.

122. Anthophyllite, Blandford.
123. Cummingtonite, quartz and garnets, Warwick.
124. Cummingtonite, Cummington.
125. Black mica, Westfield.
126. Black mica, Norwich.
127. Fibrous talc, Blandford.
128. Red oxide of iron from manganese vein, Conway.
129. Pyrolusite, Conway.
130. Pyrolusite with siliceous sinter, Amherst.
131. Ore of Manganese, Hinsdale.
132. Micaceous iron, Montague.
133. Mispickel, Worcester.
134. Mispickel, Worcester.
135. Massive mispickel, Worcester.
136. Spathic iron, Worcester.
137. Spathic iron, Sterling.
138. Spathic iron with copper pyrites, Sterling.
139. Galena and blende, Sterling.
140. Reddish blende, (zinc,) Sterling.
141. Rutile, Conway.
142. Firestone, Stafford, Connecticut.
143. Mica slate passing into granite, Russell.
144. Mica slate with white quartz, Heath.
145. Mica slate, Enfield.
146. Black mica slate, Railroad cut, Monson.
147. Mica slate, Railroad cut, Auburn.
148. Mica slate, Railroad cut, Clappville, Leicester.
149. Mica slate, Railroad cut, Sodom, Wilbraham.
150. Mica slate, Monroe.
151. Mica slate, Railroad cut, Sodom, Wilbraham.
152. Mica slate, Warwick.
153. Mica slate, Russell.
154. Mica slate, Russell.
155. Rhomboidal mica slate, Palmer.
156. Mica slate, Westminster.
157. Mica slate, Erving.
158. Mica slate, Sodom Mountain, Northfield.
159. Mica slate, Sodom Mountain, Southwick.
160. Mica slate interstratified with limestone, West Stockbridge, east part.
161. Mica slate, Lenox Mount, Lenox.
162. Feldspathic mica slate, Granville.
163. Feldspathic mica slate, West Washington.
164. Mica slate, Norwich.
165. Mica slate above limestone, Shakerville, Tyringham.
166. Mica slate, Erving.
167. Mica slate, Warwick.
168. Firestone, Warwick.

169. Mica slate, Enfield.
170. Firestone, Warwick.
171. Firestone, Warwick.
172. Mica slate, Lenox Mountain, Lenox.
173. Mica slate passing into quartz rock, South Mountain, Northfield.
174. Whetstone slate, Wendell.
175. Mica slate, Saddle Mountain, east ridge.
176. Mica slate, calcareous with iron pyrites, Adams.
177. Talco-micaceous slate, Boston Corner.
178. Mica slate, Saddle Mountain, Williamstown.
179. Mica slate, Williamstown.
180. Argillo-micaceous slate, Egremont.
181. Aluminous slate, Conway.
182. Native alum, Conway.
183. Mica slate, Russell.
184. Mica slate, top of Wachusett.
185. Mica slate, East Rutland.
186. Talco-micaceous slate, Millville, Mendon.
187. Mica slate, West Leominster.
188. Argillo-micaceous slate, Williamstown, west of college.
189. Mica slate and limestone over the marble, Lanesborough.
190. Mica slate over limestone, North Ashford.
191. Mica slate over marble, North Ashford.
192. Mica slate, Mount Everett, Mount Washington.
193. Mica slate, above east slope of Mount Everett.
194. Mica slate, Sheffield, west of Village.
195. Mica slate with decomposing iron pyrites, Saddle Mountain, Williamstown.
196. Mica slate, above limestone, Hudson Brook, North Adams.
197. Talco-micaceous slate with hornblende and iron pyrites, Monson.
198. Talco-micaceous slate with pyrites, Monson.
199. Mica slate, Railroad cut, Monson.
200. Mica slate, Franklin.
201. Mica slate, Franklin.
202. Mica slate, Spicket Falls, Methuen.
203. Augitic mica slate, Heath.
204. Augitic mica slate, Sodom Mountain, Southwick.
205. Mica hornblende and feldspar, apparently of igneous origin, in mica slate, Warwick.
205. Porous quartz with oxide of iron, Richmond.
206. Mica slate with garnets, Northfield, South Mountain.
207. Mica slate with garnets, Northfield, South Mountain.
208. Mica slate with staurotide and garnets, Auburn.
209. Mica slate with garnets, Railroad, Middlefield.
210. Garnetiferous mica slate, West Rowe.
211. Mica slate with staurotide and garnets, South Mount, Northfield.
212. Iron pyrites, Saddle Mount, Adams.
213. Mag. ox. iron, Warwick.

214. Mag. ox. iron, (boulder,) Orange.
215. Micaceous ox. iron, Montague.
216. Kyanite, Palmer.
218. Kyanite, Palmer.
219. Zoisite in quartz, Heath.
220. Zoisite and hornblende, Heath.
221. Epidote and garnet, Warwick.
222. Epidote and quartz, Warwick.
223. Epidote and quartz, Warwick.
224. Garnet and mag. ox. iron, Warwick.
225. Garnet and mag. ox. iron, (boulder,) Orange.
226. Garnet and quartz, Warwick.
227. Black tourmaline in quartz, Northfield.
228. Fibrolite in mica slate, Phillipston.
229. Masonite, (Jackson,) Auburn.
230. Masonite, (Jackson,) Auburn.
231. Masonite, (Jackson,) Warwick, Rhode Island.

XII. Talcose Slate, *(chiefly metamorphic.)*

1. Talcose slate, Graylock.
2. Talcose slate, Florida.
3. Talcose slate, West Stockbridge.
4. Talcose slate, Graylock.
5. Scaly greenish talc, Westfield.
6. Green talc near steatite, Middlefield.
7. Foliated light green talc, Rowe.
8. Foliated light green talc, Middlefield.
9. Foliated light green talc, Windsor.
10. Green steatite, Zoar.
11. Steatite with rhomb spar, Zoar.
12. Steatite with rhomb spar, Windsor, north-west part.
13. Steatite with bitter spar, Windsor, north-east part.
14. Steatite with brown spar, Smithfield, Rhode Island.
15. Steatite, Middlefield.
16. Steatite, for pipe, Grafton, Vermont.
17. Very fine steatite, Blandford.
18. Steatite, Somers, Connecticut.
19. Steatite, Groton.
20. Chlorite, with feldspar, Cummington.
21. Fine grained chlorite with feldspar, Goshen.
22. Slaty chlorite, Smithfield, Rhode Island.
23. Chlorite with steatite, Middlefield.
24. Chlorite slate, Peru.
25. Chlorite slate with rutile and feldspar, Windsor.
26. Talco-chloritic slate, Little Compton, Rhode Island.
27. Talco-chloritic slate, Smithfield, Rhode Island.
28. Talco-chloritic slate, epidotic, Cumberland, Rhode Island.

29. Talco-chloritic passing into hornblende slate, Little Compton, Rhode Island.
30. Talcose slate, talc and quartz, Little Compton, Rhode Island.
31. Talcose slate, Hawley.
32. Talcose slate, Hawley.
33. Greenish talcose slate, Middlefield.
34. Greenish talcose slate, Plainfield.
35. Greenish talcose slate, Florida.
36. Greenish talcose slate, Lenox.
37. Talcose slate with mica, Hawley.
38. Talcose slate, iron mine, Somerset, Vermont.
39. Talcose slate, east side of serpentine, Chester.
40. Talcose slate, Barre.
41. Talcose slate, Rowe.
42. Talcose slate, Rowe.
43. Talc and limestone, Whitingham, Vermont.
44. Talc quartz and carb.-iron, Hawley.
45. Quartz with hydrate of iron, Hawley.
46. Talc quartz and hornblende, Hawley.
47. Talc quartz and hornblende, Charlemont.
48. Talc quartz and hornblende, Hawley.
49. Talc quartz and hornblende, Hawley.
50. Talc quartz and hornblende, Hawley.
51. Talc quartz and feldspar, Smithfield, Rhode Island.
52. Talc quartz and feldspar, porphyritic, Hawley.
53. Talcose slate with octahedral iron, Hawley.
54. Talcose slate with octahedral iron, Blandford.
55. Micaceous ox. iron, Hawley.
56. Mag. ox. iron, native magnet, Somerset, Vermont.
57. Native magnet, Cumberland, Rhode Island.
58. Native magnet, porphyritic with crystals of feldspar, Cumberland, Rhode Island.
59. Porous quartz with hydrate of iron, gangue of gold, Somerset, Vermont.
60. Porous quartz in talcose slate with hydrate of iron, for comparison, Virginia.
61. Pyrolusite, Plainfield.
62. Rhodonite, Cummington.
bitter spar, Middlefield.
64. White bitter spar and green talc, Middlefield.
65. Salmon colored talc, Middlefield.
66. Miascite, Zoar.
7. Miascite, Zoar.
68. Asbestus, Zoar.
69. Asbestus, Pelham.
70. Asbestus, Blandford.
71. Asbestus, Shutesbury.
72. Tremolite, Middlefield.

73. Fibrous hornblende in quartz, Plainfield.
74. Fasciculite in talcose slate, Plainfield.
75. Fasciculite in talcose slate, Plainfield.
76. Actinolite in talc, Blandford.
77. Actinolite in talc, Windsor.
78. Actinolite from steatite quarry, Blandford.
79. Radiated actinolite, Blandford.
80. Steatite, Chester, west part.
81. Steatite, Chester, north part.
82. Steatite, Rowe.
83. Steatite, West Petersham.
84. Steatite, Andover, east part.
85. Steatite, Andover, east part.
86. Steatite, (boulder,) Warren.
87. Steatite, Cheshire.
88. Steatite, Fitchburg.
89. Talcose slate with hornblende and iron pyrites, Monson.
90. Talcose slate, Graylock, North Adams.
91. Talcose slate, West Stockbridge.
92. Talcose slate, top of Tom Ball, Alford.
93. Taconic talcose slate, Alford.
94. Taconic talcose slate with mag. oxide iron, Richmond.
95. Talcose slate, Graylock, east ridge.
96. Talcose slate, Hancock.
97. Talcose slate, East Hancock.
98. Talcose slate, Taconic Mountain, Boston Corner.
99. Talcose slate, Kent's quarry, New Ashford.
100. Talcose slate with mag. oxide iron, New Ashford.
101. Talcose slate, Bashapish Falls, Mount Washington.
102. Talcose slate, top of Mount Everett.
103. Talcose slate, top of Mount Everett.
104. Taconic talcose slate, West Williamstown.
105. Taconic talcose slate, West Williamstown.
106. Talcose slate, porphyritic, Mount Everett.
107. Talcose slate, in the hollow, Mount Washington.
108. Talcose slate, Hoosac Mountain, North Adams.
109. Taconic talcose slate, Williamstown.
110. Chlorite slate with pyrites, Hawley.
111. Chlorite slate, West Stockbridge, west part.
112. Chlorite slate, Hancock.
113. Talcose slate and epidote, Hancock.
114. Talcose slate and chlorite, (boulder,) Medfield.
115. Talcose slate with hornblende, Monson.
116. Chlorite and quartz, Hancock.
117. Chlorite, Williamstown.
118. Chlorite slate, West Stockbridge.
119. Mag. oxide iron, Chester.
120. Hornblende in talcose slate, Chester.

XIII. SERPENTINE. *(Metamorphic.)*

1. Compact noble serpentine, polished, Newbury.
2. Compact serpentine with massive garnet, polished, Newbury.
3. Serpentine, with green amianthus, Newbury.
4. Compact serpentine, Newbury.
5. Compact serpentine, Chester.
6. Polished serpentine, Middlefield.
7. Slaty serpentine, Chester.
8. Serpentine with grains of chromic iron, Windsor, north-east part.
9. Serpentine, Windsor, north-west part.
10. Serpentine, Blandford.
11. Serpentine, (boulder,) Blandford.
12. Black compact serpentine, Newport, Rhode Island.
13. Variegated serpentine, Newport, Rhode Island.
14. Dark green compact serpentine, (boulder,) Leverett.
15. Dark gray compact serpentine, Chelmsford.
16. Dark green serpentine with amianthus and Deweylite, Russell.
17. Glazed serpentine, Zoar.
18. Glazed serpentine, Zoar.
19. Serpentine steatite and brown spar, Zoar.
20. Serpentine steatite and brown spar, Zoar.
21. Black serpentine and talc, New Salem.
22. Black serpentine and talc, (polished,) Pelham.
23. Dark green serpentine, (polished,) Blandford.
24. Black serpentine, talc, actinolite, Westfield.
25. Light green compact serpentine, (polished,) Russell.
26. Black serpentine talc, schiller and calcite spar, (polished,) Granville.
27. Serpentine and calcite, (polished,) Westfield.
28. Serpentine and calcite, Westfield.
29. Serpentine and calcite, Westfield, (polished.)
30. Serpentine and calcite, Westfield.
31. Compact feldspar, lime quarry, Newbury.
32. Compact scapolite? Westfield.
33. Mammillary chalcedony, Blandford.
34. Yellow jasper, Middlefield.
35. Chalcedony, Middlefield.
36. Drusy quartz, Middlefield.
37. Satin spar, Newbury.
38. Tremolite, Newbury.
39. Mussite, Blandford.
40. Massive garnet, Westfield.
41. Actinolite, Westfield.
42. Asbestiform actinolite, Westfield.
43. Massive chromic iron, Blandford.
44. Chromic iron in serpentine, Blandford.
45. Serpentine, Lynnfield.
46 Serpentine, (polished,) Lynnfield.

47. Carbonate of magnesia on serpentine, Lynnfield.
48. Diallage in serpentine, Sodom Mountain, Southwick.
49. Serpentine, Cheshire.
50. Serpentine, (boulder,) Russell.
51. Chromic iron, Chester.
52. Serpentine, Chester.
53. Dark colored serpentine, Chester.
54. Serpentine with schiller spar, Chester.

XIV. Hornblende Slate. *(Metamorphic and Hypozoic.)*

1. Lamellar black hornblende, Granville.
2. Lamellar black hornblende, Belchertown.
3. Lamellar hornblende with garnets, Norwich.
4. Lamellar hornblende, Belchertown.
5. Hornblende slate, (boulder,) South Hadley Canal.
6. Fibrous hornblende, Enfield.
7. Granular hornblende, Middlefield.
8. Fibrous hornblende, Leverett.
9. Fibrous hornblende, Florida.
10. Compact hornblende, Lincoln.
11. Compact hornblende, Smithfield, Rhode Island.
12. Compact hornblende, Marlborough.
13. Hornblende slate, Shelburne.
14. Fibrous hornblende, Merrimack River.
15. Fibrous hornblende, Whately.
16. Hornblende and feldspar, Sudbury.
17. Hornblende slate with feldspar, Bernardston.
18. Rhomboidal hornblende slate, Whately.
19. Hornblende slate, Ware.
20. Compact hornblende slate, Smithfield, Rhode Island.
21. Hornblende quartz and feldspar, Gill.
22. Quartz and feldspar, vein in Trap, Gill.
23. Hornblende and feldspar, Whately.
24. Hornblende and feldspar, Whately.
25. Hornblende and feldspar, Whately.
26. Coarse feldspathic hornblende slate, Ware.
27. Coarse feldspathic hornblende slate, Ware.
28. Hornblende slate, mouth of Miller's River.
29. Hornblende slate with layers of feldspar, Dana.
30. Hornblende, feldspar, mica, Plumbago mine, Sturbridge.
31. Porphyritic hornblende slate, Heath.
32. Porphyritic hornblende slate, (boulder, originally from New Fane, Vermont,) South Hadley Falls.
33. Porphyritic boulder, Amherst, (New Fane, Vermont.)
34. Hornblende slate with compact feldspar, Whately.
35. Hornblende and feldspar, Easton.
36. Hornblende and feldspar, Canton.

37. Hornblende and feldspar, Plymouth.
38. Hornblende and feldspar, Whately.
39. Hornblende and quartz with a vein, Becket.
40. Hornblende slate with vein of Graphic Granite, Williamsburg.
41. Hornblende slate, Shelburne Falls.
42. Hornblende slate with quartz vein, Warwick.
43. Hornblende slate, Hawley.
44. Hornblende slate and feldspar, the hornblende vesicular, Conway.
45. Hornblende, feldspar, and mica, Amherst.
46. Hornblende with augite, Becket.
47. Hornblende, Stow.
48. Hornblende, feldspar, and mica, Dracut.
49. Hornblendic granite, Leverett.
50. Hornblendic granite, Leverett.
51. Hornblende and epidote, Granville.
52. Hornblende, in contact with serpentine, Blandford.
53. Rhomboidal hornblende slate, Whately.
54. Feldspathic hornblende slate, Whately.
55. Hornblende and chlorite, Whately.
56. Actinolite slate, (actinolite, quartz and feldspar,) Shutesbury.
57. Actinolite slate, Belchertown.
58. Hornblende slate with layer of epidote, Pelham.
59. Hornblende slate with cryst. hornblende, Pelham.
60. Massive hornblende, Sturbridge.
61. Massive hornblende, West Northfield.
62. Massive hornblende and feldspar, Tolland.
63. Massive hornblende and feldspar, Tolland.
64. Massive hornblende and feldspar, Tolland.
65. Massive hornblende and feldspar, Tolland.
66. Massive hornblende and feldspar, Tolland.
67. Massive hornblende, (boulder,) Dedham.
68. Hornblende rock, Methuen.
69. Feldspathic hornblende slate, Brimfield.
70. Feldspathic hornblende slate, Brimfield.
71. Porphyritic hornblende slate, Monson.
72. Hornblende slate, Methuen.
73. Hornblende slate, East Orange.
74. Hornblende slate, Wendell.
75. Hornblende slate, Mount Grace, Warwick.
76. Hornblende slate with feldspar, Wilbraham.
77. Feldspathic hornblende slate, Granville.
78. Feldspathic hornblende slate, Warwick.
79. Feldspathic hornblende slate, Granby, south-east part.
80. Feldspathic hornblende slate, Dana.
81. Feldspathic hornblende slate with mica, New Bedford.
82. Feldspathic hornblende slate, epidotic, Ludlow.
83. Hornblende slate with feldspar and mica, Palmer.

84. Feldspathic hornblende slate, South Orange.
85. Feldspathic hornblende slate, South Mount, Northfield.
86. Feldspathic hornblende slate, Wendell.
87. Striped hornblende slate, Boxford.
88. Epidotic hornblende slate, Holliston.
89. Chlorite hornblende slate, West Northfield.
90. Hornblende and feldspar, Concord.
91. Hornblende talc and epidote passing into sienite, Beverly.
92. Sienitic rock with slickenside, Natick.
93. Hornblende with epidote and calcite, Lynnfield.
94. Hornblende and chlorite, North Wrentham.
95. Hornblende quartz feldspar, structure mechanical, Chesterfield.
96. Chloritic pyritiferous hornblende slate, East Orange.
97. Zeolite on hornblende, Sodom, Wilbraham.

XV. Gneiss. (*Metamorphic and Hypozoic.*)

1. Granitic gneiss, Pelham.
2. Granitic gneiss, Templeton.
3. Granitic gneiss, Brookfield.
4. Granitic gneiss, New Braintree.
5. Granitic gneiss, Pelham.
6. Granitic gneiss, Paxton.
7. Granitic gneiss, Petersham.
8. Granitic gneiss, granular, Monson.
9. Granitic gneiss, Athol.
10. Granitic gneiss, Princeton.
11. Granitic gneiss, Blandford.
12. Sienitic gneiss, (with hornblende,) Mendon.
13. Granitic gneiss, texture somewhat mechanical, Bolton.
14. Granitic gneiss, Worcester.
15. Granitic gneiss, Worcester.
16. Granitic gneiss, (flesh-colored,) Sudbury.
17. Granitic gneiss, talcose, North Brookfield.
18. Schistose granitic gneiss, Rochester.
19. Schistose granitic gneiss, Oxford.
20. Granitic gneiss, Sudbury.
21. Granitic gneiss, Billerica.
22. Schistose gneiss, Dudley.
23. Schistose gneiss, Purgatory, Sutton.
24. Schistose gneiss, granular, Wilbraham.
25. Schistose gneiss, mouth of Miller's River.
26. Schistose gneiss, Buckland.
27. Schistose gneiss, Shelburne Falls.
28. Schistose gneiss, Amherst.
29. Schistose gneiss with much mica, New Bedford.
30. Gneiss passing into mica slate, Worcester.
31. Gneiss passing into mica slate, Paxton.

32. Gneiss passing into mica slate, Hardwick.
33. Gneiss feldspar in tuberculous masses, Worcester.
34. Junction of gneiss and mica slate, Worcester.
35. Schistose gneiss, Worcester.
36. Gneiss passing into mica slate, (boulder,) Colrain.
37. Gneiss passing into mica slate, Windsor.
38. Gneiss passing into mica slate, Little Compton, Rhode Island.
39. Gneiss passing into mica slate, Monson.
40. Gneiss, East Oxford.
41. Gneiss, Florida.
42. Schistose gneiss passing into mica slate, with pyrope, Weston.
43. Schistose gneiss with pyrope, Shrewsbury.
44. Gneiss, west base of Wachusett, Princeton.
45. Gneiss, Grafton.
46. Gneiss, Charlton.
47. Porphyritic gneiss, Harvard.
48. Talcose gneiss, Framingham.
49. Talcose gneiss, Leverett.
50. Steatite from gneiss, Worcester.
51. Steatite from gneiss, Worcester.
52. Steatite from gneiss, New Salem.
53. Steatite passing into serpentine, New Salem.
54. Chloritic steatite, Conway, (originally Whitingham, Vermont.)
55. Schistose gneiss with veins of chlorite, Bolton.
56. Laminar gneiss, Windsor.
57. Laminar gneiss, West Webster.
58. Laminar gneiss, Amherst.
59. Laminar gneiss, Grafton.
60. Laminar gneiss, Pelham.
61. Laminar gneiss, Pelham.
62. Laminar gneiss, Norfolk, Connecticut.
63. Gneiss, hornblende slate interlaminated, Enfield.
64. Gneiss interlaminated with hornblende slate, Warwick.
65. Gneiss, Savoy.
66. Gneiss, Windsor.
67. Gneiss, Dalton.
68. Gneiss, Becket.
69. Gneiss with vein of granite, Pelham.
70. Gneiss, Douglas.
71. Gneiss, Douglas.
72. Porphyritic gneiss, Ware.
73. Porphyritic gneiss, Pelham.
74. Gneiss, (feldspar flesh-colored,) Amherst.
75. Porphyritic gneiss with epidote, Pelham.
76. Coarse porphyritic gneiss, New Braintree.
77. Coarse gneiss, porphyritic, Ware.
78. Coarse porphyritic gneiss, Ware.

79. Gneiss, Methuen.
80. Gneiss, Paxton.
81. Porphyritic gneiss, Montague.
82. Schistose gneiss, Tolland.
83. Amphibolic gneiss with hornblende, Montague.
84. Amphibolic gneiss with hornblende, Leverett.
85. Amphibolic gneiss with hornblende, Enfield.
86. Amphibolic gneiss with hornblende, Pelham.
87. Epidotic gneiss, Amherst.
88. Epidotic gneiss, Pelham.
89. Epidotic gneiss, Amherst.
90. Epidotic gneiss, Grafton.
91. Epidotic gneiss, Amherst.
92. Augitic gneiss, Lee.
93. Augitic gneiss, Lee.
94. Augitic gneiss, Lee.
95. Augitic gneiss, Lee.
96. Anthophyllitic gneiss, Enfield.
97. Anthophyllitic gneiss, Enfield.
98. Arenaceous gneiss, Southbridge.
99. Arenaceous gneiss, Smithfield, Rhode Island.
100. Arenaceous gneiss, Smithfield, Rhode Island.
101. Talcose gneiss, Smithfield, Rhode Island.
102. Gneiss with a serpentine granite vein, Enfield.
103. Common plumbago, Sturbridge.
104. Apparently fibrous plumbago, Sturbridge.
104. Partly crystaline plumbago, Sturbridge.
104. Fuller's earth, (?) Plumbago mine, Sturbridge.
105. Bog iron ore, Plumbago mine, Sturbridge.
106. Bog iron ore in gneiss, North Brookfield.
107. Garnet and molybdenite in gneiss, North Brookfield.
108. Alum and sulphate of iron on gneiss, Leominster.
109. Alum and sulphate of iron on gneiss, Barre.
110. Pyrope garnet in gneiss, New Braintree.
111. Pyrope with adularia, Brimfield.
112. Pyrope, Norwich, Connecticut.
113. Feldspar in gneiss, Boxborough.
114. Green adularia with mica, (polished,) Sturbridge.
115. Adularia, Brimfield.
116. Adularia, Brimfield,
117. Black tourmaline, Pelham.
118. Black tourmaline, Pelham.
119. Sphene in augitic gneiss, Lee.
120. Augite and scapolite, Lee.
121. Iron pyrites, Hubbardston.
122. Iron pyrites, Hubbardston.
123. Blue quartz and pyrites, Hubbardston.

124. Mag. ox. iron in gneiss, Grafton.
125. Crystallized and drury quartz, Pelham.
126. Crystallized and drury quartz, Pelham.
127. Crystallized and drury quartz, Pelham.
128. Radiated quartz, Pelham.
129. Amethystine quartz, Pelham.
130. Bluish mammillary chalcedony, Pelham.
131. Breccia agate, (polished,) Rochester.
132. Gray copper, Brimfield.
133. Actinolite in feldspar, Chelmsford.
134. Granitic gneiss, Hubbardston.
135. Granitic gneiss, architectural, New Bedford.
136. Granitic gneiss with garnets, Fairhaven.
137. Gneiss, quarry, Monson.
138. Gneiss, Railroad, Middlefield.
139. Gneiss with epidote, Leverett.
140. Gneiss, West Medway.
141. Gneiss with tourmaline, Wendell.
142. Granitic gneiss, Tolland.
143. Slaty gneiss, Middle Granville.
144. Contorted gneiss, Sandisfield.
145. Gneiss, Cheshire.
146. Granitic gneiss, red feldspar, Palmer.
147. Granitic gneiss, Brimfield.
148. Porphyritic gneiss, Brimfield.
149. Porphyritic gneiss with gneiss, Brimfield.
150. Porphyritic gneiss, Monson.
151. Porphyritic gneiss, Rutland.
152. Porphyritic slaty gneiss, Sandisfield.
153. Gneiss, Purgatory, Great-Barrington.
154. Gneiss with hornblende, Beartown Mountain.
155. Gneiss with hornblende, quarry, Palmer.
156. Granitic gneiss, Brimfield.
157. Slaty gneiss, Sherburne.
158. Gneiss, next to quartz rock, Washington.
159. Granitic gneiss, Saddle Mountain, Northfield.
160. Gneiss with pyrope and mica, Erving.
161. Gneiss with pyrope and mica, Sandisfield.
162. Gneiss with pyrope and talc, Montague.
163. Gneiss with pyrope and mica, North Adams.
164. Gneiss with pyrope, Clarksburg.
165. Rhomboidal gneiss, quarry, Palmer.
166. Slaty gneiss, summit level of Railroad, Washington.
167. Slaty gneiss, Fairhaven.
168. Augitic gneiss, Washington, north-west part.
169. Slaty gneiss, Blackstone.
170. Granitic gneiss, Dana.

171. Slaty gneiss, Dana.
172. Slaty gneiss, Ashby.
173. Slaty gneiss, Railroad, Auburn.
174. Slaty gneiss with mica slate, Auburn.
175. Slaty gneiss with mica slate, Auburn.
176. Slaty gneiss with mica slate, Auburn.
177. Gneiss with hornblende slate, Dartmouth.
178. Gneiss and hornblende slate, Dana.
179. Slaty gneiss, Hadsell's quarry, New Marlborough.
180. Slaty gneiss, Hadsell's quarry, New Marlborough.
181. Slaty gneiss, Middle Granville.
182. Slaty gneiss, Royalston.
183. Gneiss, rhomboidal, Wales.
184. Slaty gneiss, Sturbridge.
185. Slaty gneiss, Shaker Village, Tyringham.
186. Slaty gneiss with tourmaline, Athol.
187. Slaty gneiss, Royalston.
188. Slaty gneiss, Railroad, Natick.
189. Slaty gneiss, Railroad, Washington.
190. Slaty gneiss, Sodom, Wilbraham.
191. Slaty gneiss, Beverly.
192. Granitic gneiss, original of the buhrstone, Washington.
193. Granitic gneiss with garnets, Southbridge.
194. Quartzose gneiss, Wendell.
195. Gneiss firestone, Wendell.
196. Quartzose gneiss, Bellingham.
197. Augitic gneiss, Bellingham.
198. Augitic gneiss, Dracut.
199. Augitic gneiss, Railroad cut, Natick.
200. Epidotic gneiss, (boulder,) Carver.
201. Porphyritic gneiss, (boulder,) Carver.
202. Gneiss with pyrope and adularia, Morse's graphite quarry, Stockbridge.
203. Gneiss, Barre.
204. Gneiss, Brimfield.
105. Gneiss, Brimfield.
206. Gneiss with garnets, Granville.
207. Foliated graphite and feldspar, Sturbridge.
208. Hornblende and scapolite, Tyringham.
209. Hornblende with sphene, Tyringham.
210. Hornblende with quartz, Tyringham.
211. Hornblende with feldspar, Tyringham.
212. Hornblende and feldspar, Railroad cut at summit level, Washington.
213. Hornblende and feldspar, Railroad cut at summit level, Washington.
214. Anthophyllite and garnet, Phillipston.
215. Anthophyllite in gneiss, Barre.
216. Augite and talc, Cheshire.
217. Augite and epidote, Athol.

218. Iolite in gneiss, Brimfield.
219. Adularia, Brimfield.
220. Adularia, Brimfield.
221. Rutile, West Barre.
222. Epidote and fluorspar, Barre.
223. Tourmaline in gneiss, Shutesbury.
224. Tourmaline and epidote, Enfield.
225. Feldspar in gneiss, Three Rivers, Palmer.
226. Feldspar in gneiss, Three Rivers, Palmer.
227. Prehnite in gneiss, Three Rivers, Palmer.
228. Zeolite and feldspar, Three Rivers, Palmer.
229. Red calcite on gneiss, Three Rivers, Palmer.
230. Red calcite and feldspar, Three Rivers, Palmer.
231. Red calcite on tortuous gneiss, Three Rivers, Palmer.
232. Allanite on gneiss, South Royalston.
233. Allanite on gneiss, Athol.
234. Mica and chlorite in gneiss, Blackstone.
235. Corntorted hornblendic gneiss, Hardwick.
236. Mammillary chalcedony, Tyringham.
237. Mammillary chalcedony, Tyringham.
238. Molybdenite, Pelham.
239. Bucholzite, Athol.
240. Amethyst in gneiss, Franklin.
241. Green hornstone, a boulder from which Shay's soldiers manufactured their flints, Pelham.
242. Pyrope, Graphite bed, Sturbridge.
243. Pyrope, Sturbridge.
244. Graphite in gneiss, Washington.
245. Greenish feldspar with copper ore, Railroad, Russell.

UNSTRATIFIED ROCKS.

XVI. Greenstone.

1. Common greenstone, (hornblende and feldspar,) Sunderland.
2. Common greenstone, Deerfield.
3. Greenstone, Mount Holyoke.
4. Greenstone, Turner's Falls.
5. Greenstone, Mount Tom.
6. Greenstone in gneiss, Pelham.
7. Epidotic greenstone, Chelsea.
8. Greenstone approaching to sienite, Newburyport.
9. Greenstone, Lexington.
10. Greenstone, Holliston.
11. Greenstone, Concord.

12. Epidotic greenstone, Waltham.
13. Common greenstone, Nahant.
14. Greenstone from vein in clay slate, Charlestown.
15. Greenstone passing into sienite, Charlestown.
16. Greenstone passing into sienite, (boulder,) West Springfield.
17. Greenstone passing into sienite, Holliston.
18. Greenstone passing into sienite, Dover.
19. Greenstone passing into sienite, Stoughton.
20. Greenstone passing into sienite, Easton.
21. Greenstone, the feldspar in bronze-colored folia, West Springfield.
22. Greenstone with bronze-colored feldspar, Mount Holyoke.
23. Greenstone, Hingham.
24. Greenstone, Newton.
25. Greenstone passing into sienite, Blue Hills.
26. Greenstone, Quincy.
27. Greenstone from a vein in gneiss, Rutland.
28. Greenstone, Nahant.
29. Greenstone from a vein in gneiss, Northfield.
30. Columnar prism, tetragonal prism, Mount Holyoke.
31. Columnar prism, pentagonal prism, Mount Holyoke.
32. Columnar prism, trigonal prism, Mount Holyoke.
33. Curved exfoliated mass from a greenstone column, Mount Holyoke.
34. Compact greenstone, the ingredients distinct, Nahant.
35. Compact greenstone, Blue Hills.
36. Compact greenstone, (boulder,) Framingham.
37. Greenstone from a vein in granite, Foxborough.
38. Chiefly greenish compact feldspar, Salisbury.
39. Chiefly greenish compact feldspar, Rowley.
40. Compact feldspar, Dedham.
41. Compact feldspar, Dedham.
42. Compact feldspar, Dedham.
43. Compact feldspar, Dedham.
44. Indurated clay, Titan's Pier, South Hadley.
45. Greenstone with red calcite, Deerfield.
46. Hornblende augite and feldspar, Nahant.
47. Hornblende augite and feldspar, Nahant.
48. Hornblende augite and feldspar, Nahant.
49. Hornblende augite and feldspar, Nahant.
50. Porphyritic greenstone, Cape Ann.
51. Porphyritic greenstone, Easton.
52. Porphyritic greenstone, Salem.
53. Porphyritic greenstone, imbedded crystals of Karinthin, Ipswich.
54. Reddish porphyritic greenstone, Turner's Falls.
55. Porphyritic greenstone, base reddish, Deerfield.
56. Greenstone porphyritic and epidotic, with iron pyrites, Topsfield.
57. Porphyritic greenstone, Turner's Falls.
58. Porphyritic greenstone, Deerfield.

59. Slaty micaceous greenstone, Reading.
60. Amygdaloidal greenstone, nodules calcite, Deerfield.
61. Amygdaloidal greenstone, nodules siliceous, South Hadley Falls.
62. Amygdaloidal greenstone, nodules calcite, Deerfield.
63. Amygdaloidal greenstone, nodules calcite, Turner's Falls.
64. Amygdaloidal greenstone, nodules siliceous, Titan's Pier.
65. Amygdaloidal greenstone, nodules foliated chlorite, Turner's Falls.
66. Amygdaloidal greenstone, nodules earthy chlorite, West Springfield.
67. Amygdaloidal greenstone, nodules calcite, Rowley.
68. Concretions from greenstone, Deerfield.
69. Concretions from greenstone, Mount Holyoke.
70. Trap tufa, (tufaceous greenstone,) South Hadley Canal.
71. Trap tufa, micaceous, Deerfield.
72. Trap tufa, Titan's Pier.
73. Trap tufa, cement calcite, Deerfield.
74. Trap tufa, Northampton.
75. Trap tufa, Mount Tom.
76. Trap tufa, base reddish, Deerfield.
77. Junction of Amygdaloid and sandstone, Turner's Falls.
78. Trap tufa, West Springfield.
79. Prehnite in greenstone, Greenfield.
80. Chalcedony in greenstone, Deerfield.
81. Chalcedony in greenstone, Deerfield.
82. Chalcedony in greenstone, Greenfield.
83. Agate of chalcedony, cornelian and quartz, Deerfield.
84. Amethyst in greenstone, Deerfield.
85. Amethyst in greenstone, Deerfield.
86. Black augite in greenstone, Deerfield.
87. Prehnite augite and calcite, Deerfield.
88. Pseudo morpheus quartz and prehnite, Deerfield.
89. Calcite prehnite, &c., Deerfield.
90. Chlorophocite in greenstone, Turner's Falls.
91. Chlorophocite in greenstone, Turner's Falls.
92. Lincolnite and chabasie, Deerfield.
93. Lincolnite in greenstone, Deerfield.
94. Lincolnite and chabasie, Deerfield.
95. Lincolnite, Deerfield.
96. Lincolnite, Deerfield.
97. Lincolnite (?) on greenstone, Deerfield.
98. Smoky quartz from greenstone, West Springfield.
99. Greenstone from gneiss, Monson.
100. Greenstone from gneiss, Montague.
101. Greenstone from veins in sienite, Holliston.
102. Tufaceous greenstone from sienite, Dedham.
103. Greenstone from gneiss, Hubbardston.
104. Greenstone from gneiss, Westminster.
105. Greenstone from gneiss, Belchertown.

106. Porphyry, vein No. 2, figure 147, in sienite, Cohasset.
107. Greenstone in sienite, Railroad cut, Needham.
108. Greenstone from gneiss, Phillipston.
109. Greenstone chiefly feldspar, Phillipston.
110. Greenstone, (boulder,) Groton.
111. Epidote and greenstone, Beverly.
112. Chloritic greenstone, Railroad, Natick.
113. Greenstone, vein No. 3, figure 147, containing an unknown bronze-colored mineral, Cohasset.
114. Rock from a vein in conglomerate, Mr. Dudley's farm, Roxbury.
115. Compact trap, Dudley's farm, Dedham.
116. Quartz and brown rock, Dudley's farm, Dedham.
117. Greenstone, weathered, Pelham.
118. Slaty greenstone, Fitzwilliam, New Hampshire.
119. Vesicular trap, reddish, Sunderland.
120. Vesicular trap, black, Mount Mettawampe.
121. Vesicular trap, cavities cylindrical, Mount Mettawampe.
122. Vesicular trap with zeolite, Deerfield.
123. Porphyritic greenstone, Nantasket Beach.
124. Porphyritic trap, Beverly shore.
125. Porphyritic trap, Saugus.
126. Porphyritic trap, dyke, Beverly bridge, Salem.
127. Porphyritic greenstone, (boulder,) West Bridgewater.
128. Porphyritic greenstone, Plymouth.
129. Porphyritic greenstone, (boulder,) Pembroke.
130. Porphyritic greenstone, Manomet Hill, Plymouth.
131. Porphyritic greenstone, vein in sienite, (No. 1, figure 147,) Cohasset.
132. Porphyritic greenstone, vein in sienite, (No. 1, figure 147,) Cohasset.
133. Trap veins in sienite, Holliston.
134. Zeolite in trap, (boulder,) Newbury.
135. Amygdaloidal trap, Mount Holyoke.
136. Quartz in trap, Mount Holyoke.
137. Galena and copper pyrites from chloritic trap, Canton.
138. Greenstone column, Mount Tom.
139. Vegetable remains in trap, (boulder,) figure 96, Amherst.
140. Greenstone, Railroad, West Springfield, west part.
141. Porphyritic greenstone, West Springfield.
142. Amygdaloidal greenstone, West Springfield.
143. Amygdaloidal greenstone, West Springfield.
144. Trap tufa, West Springfield.
145. Trap tufa, West Springfield.
146. Prehnite on greenstone, West Springfield.
147. Prehnite on greenstone, West Springfield.
148. Calcite on greenstone, West Springfield.
149. Calcite on greenstone, West Springfield.
150. Calcite on greenstone, West Springfield.

XVII. Porphyry.

1. Compact feldspar, Newbury.
2. Compact feldspar, Newbury.
3. Compact feldspar with talc, Newbury.
4. Compact feldspar with dendrite, Medford.
5. Compact feldspar with quartz, Natick.
6. Compact foliated feldspar, vein in sienite, Whately.
7. Compact brecciated feldspar, Dorchester.
8. Compact brecciated feldspar, Blue Hills.
9. Compact feldspar, vein in black serpentine, Newbury.
10. Compact feldspar, vein in black serpentine, Nahant.
11. Compact feldspar, Hingham.
12. Compact feldspar, Lynn.
13. Compact feldspar, foliated, Natick.
14. Compact feldspar, lime quarry, Stoneham.
15. Variegated compact feldspar, Medford.
16. Compact feldspar passing into siliceous slate, Malden.
17. Compact feldspar, siliceous, auriferous, Blue Hills.
18. Red compact feldspar, passing into porphyry, Blue Hills.
19. Compact feldspar, passing into porphyry, Hingham.
20. Compact feldspar passing into porphyry, Milton.
21. Compact feldspar passing into porphyry, Rowley.
22. Compact feldspar passing into porphyry, Ipswich.
23. Compact feldspar passing into porphyry, metamorphic, Kent's Island, Newbury.
24. Variegated compact feldspar, Dedham.
25. Porphyry approaching sienite, (polished,) Malden.
26. Porphyry with traces of a slaty structure, Nantasket Beach.
27. Porphyry, base purple, (polished, boulder.) Orleans.
28. Porphyry, base black, Nantasket Beach.
29. Porphyry, near to amygdaloid, Westborough.
30. Between greenstone and porphyry, Ipswich.
31. Between porphyry and compact feldspar, Milton.
32. Porphyry, Blue Hills.
33. Porphyry, dark gray, (polished,) Blue Hills.
34. Porphyry, dark gray, (polished,) north of Boston.
35. Porphyry, containing quartz nodules, (polished,) Milton.
36. Light gray porphyry with quartz nodules, Milton.
37. Porphyry, reddish, Nantasket Beach.
38. Porphyry, (?) Newton.
39. Porphyry, (?) with quartz and feldspar, Milton.
40. Porphyry, red and green, Malden.
41. Red porphyry with quartz and feldspar, (boulder.) Newport, Rhode Island.
42. Red porphyry, Malden.
43. Red porphyry, Lynn.
44. Porphyry, with red base, Nantasket Beach.

45. Porphyry, with red base, (polished.) Blue Hills.
46. Porphyry, base red, (polished,) north of Boston.
47. Porphyry, base red, (polished,) Nantasket Beach.
48. Greenish porphyry, (polished.) Malden.
49. Green porphyry, (polished,) Milton.
50. Porphyry, Needham.
51. Porphyry, passing into sienite, Malden.
52. Porphyry, reddish brown, crystals of feldspar and quartz, (polished,) Blue Hills.
53. Green porphyry, passing into sienite, (smoothed,) Malden.
54. Green porphyry, crystals, feldspar and quartz, (smoothed,) Blue Hills.
55. Variegated porphyry, feldspar and quartz crystals, (smoothed,) Blue Hills.
56. Porphyry, base reddish, imbedded crystals, quartz, Quincy.
57. Porphyry, base reddish, imbedded crystals, quartz, Milton.
58. Brecciated porphyry, reddish, (polished,) Half-way rocks, Atlantic Ocean.
59. Brecciated porphyry, (smoothed,) Lynn.
60. Porphyry, (smoothed,) Malden.
61. Porphyry, (polished,) Malden.
62. Porphyry, (polished,) Nantasket Beach.
63. Greenish porphyry, Malden.
64. Porphyry with relics of a slaty structure, Nantasket Beach.
65. Dendrite on porphyry, Railroad, Lynn.
66. Dendrite on jasper, Saugus.
67. Dendrite on compact feldspar, Holliston.
68. Vein of compact feldspar in serpentine, Devil's den, Newbury.
69. Red compact feldspar, Newbury.
70. Gray compact feldspar, (?) Dedham.
71. Greenish gray compact feldspar, Newbury.
72. Compact feldspar and greenstone, Natick.
73. Porphyry, West Newbury.
74. Brecciated porphyry, Lynn.
75. Red porphyry with vein of greenish feldspar, Saugus.
76. Porphyry, Manomet Hill, Plymouth.
77. Brecciated porphyry, West Dedham.
78. Epidotic porphyry, West Dedham.
79. Porphyry with veins of compact feldspar, (boulder,) Natick.
80. Porphyry with veins of compact feldspar, West Dedham.
81. Porphyry, East Sherburne.
82. Porphyry, Lynn.
83. Porphyry, Lynn.
84. Porphyry, Manomet Hill, Plymouth.
85. Porphyry, Manomet Hill Plymouth.
86. Porphyry, (boulder,) Medfield.
87. Brown porphyry, Marblehead Neck.
88. Gray porphyry, (boulder,) North Scituate.

89. Gray porphyry, (boulder,) North Scituate.
90. Porphyry with red crystals, (boulder,) North Scituate.
91. Purple porphyry, North Scituate.
92. Purple porphyry, North Scituate.
93. Purple porphyry, North Scituate.
94. Purple porphyry, North Scituate.
95. Purple porphyry, North Scituate.
96. Purple porphyry, North Scituate.
97. Purple porphyry, North Scituate.
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103. Purple porphyry, North Scituate.
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105. Purple porphyry, North Scituate.
106. Purple porphyry, North Scituate.
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108. Purple porphyry, North Scituate.
109. Purple porphyry, North Scituate.
110. Purple porphyry, North Scituate.
111. Purple porphyry, North Scituate.
112. Purple porphyry, North Scituate.
113. Purple porphyry, North Scituate.
114. Purple porphyry, North Scituate.
115. Brown porphyry, North Scituate.
116. Brown porphyry, North Scituate.
117. Brown porphyry, North Scituate.
118. Brown porphyry, North Scituate.
119. Red porphyry, North Scituate.
120. Red porphyry, North Scituate.
121. Red porphyry, North Scituate.
122. Red porphyry, North Scituate.
123. Red porphyry, North Scituate.
124. Red porphyry, North Scituate.
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126. Red porphyry, North Scituate.
127. Red porphyry, North Scituate.
128. Red porphyry, North Scituate.
129. Red porphyry, North Scituate.
130. Red porphyry, North Scituate.
131. Red porphyry, North Scituate.
132. Red porphyry, North Scituate.
133. Red porphyry, North Scituate.
134. Red porphyry, North Scituate.
135. Green porphyry, North Scituate.

136. Green porphyry, North Scituate.
137. Green porphyry, North Scituate.
138. Green porphyry, North Scituate.
139. Green porphyry, North Scituate.
140. Green porphyry, North Scituate.
141. Porphyry conglomerate, North Scituate.
142. Porphyry conglomerate, North Scituate.
143. Porphyry conglomerate, North Scituate.
144. Porphyry conglomerate, North Scituate.
145. Porphyry conglomerate, North Scituate.
146. Porphyry conglomerate, North Scituate.
147. Veined porphyry, North Scituate.
148. Veined porphyry, North Scitnate.
149. Variegated porphyry, North Scituate.
150. Variegated porphyry, North Scituate.

XVIII. Sienite.

1. Feldspar and hornblende, (smoothed,) Newbury.
2. Feldspar and hornblende, near porphyry, Nahant.
3. Feldspar and hornblende, (smoothed,) Stoneham.
4. Brecciated feldspar and hornblende, Foxborough.
5. Feldspar and hornblende, Concord.
6. Feldspar and hornblende, (smoothed,) Dover.
7. Feldspar and hornblende, (smoothed,) Reading.
8. Feldspar and hornblende, (smoothed,) Nahant.
9. Feldspar and hornblende, Norfolk County.
10. Feldspar and hornblende, Rowley.
11. Feldspar and hornblende, Hangman's Island, Boston Harbor.
12. Feldspar and hornblende in distinct crystals, (smoothed,) Dedham.
13. Feldspar and hornblende, (smoothed,) Randolph.
14. Feldspar and hornblende, Reading.
15. Feldspar and hornblende, Cumberland, Rhode Island.
16. Feldspar, hornblende and epidote, Dedham.
17. Sienite, Salisbury.
18. Sienite, Manchester.
19. Sienite, (Quincy granite,) Quincy.
20. Sienite, (smoothed,) Quincy.
21. Sienite, (boulder,) Mansfield.
22. Sienite, Franklin.
23. Sienite, (smoothed,) Danvers.
24. Sienite, (smoothed,) Squam, Gloucester.
25. Sienite, (smoothed,) Squam, Gloucester.
26. Sienite, (smoothed,) Sandy bay, Gloucester.
27. Sienite, (smoothed,) Sandy bay, Gloucester.
28. Sienite, (smoothed,) Squam, Gloucester.
29. Sienite, (smoothed,) North Bridgewater.
30. Quartz and feldspar, (smoothed,) Manchester.

31. Quartz and feldspar, (smoothed,) Foxborough.
32. Quartz and feldspar, (smoothed,) Easton.
33. Quartz and compact feldspar, (smoothed,) West Cambridge.
34. Quartz and compact feldspar, Hingham.
35. Quartz and compact feldspar, Sherburne.
36. Quartz and blood-red feldspar, (smoothed,) (boulder,) Marshfield.
37. Sienite, (smoothed,) Scituate.
38. Quartz and feldspar, (smoothed,) Weston.
39. Quartz and feldspar, Middleborough.
40. Quartz and feldspar, Weston.
41. Quartz and feldspar, Foxborough.
42. Quartz and feldspar, Danvers.
43. Compact feldspar and quartz, Newbury.
44. Red and greenish feldspar with quartz chloritic, Saugus.
45. Quartz and compact feldspar, close to the jasper, Saugus.
46. Rock passing into porphyry, Newbury.
47. Rock passing into porphyry, Manchester.
48. Rock passing into porphyry, Malden.
49. Micaceous sienite, Belchertown.
50. Sienite, (smoothed,) Belchertown.
51. Sienite, (smoothed,) Northampton.
52. Micaceous sienite, Williamsburg.
53. Micaceous sienite, Whately.
54. Sienite with much hornblende, Northampton.
55. Sienite with epidotic veins, Whately.
56. Sienite, Whately.
57. Sienite, chiefly feldspar, Whately.
58. Sienite, Gloucester.
59. Feldspar, chlorite and veins of epidote, Salisbury.
60. Feldspar, hornblende (?) and mica, (smoothed,) Medford.
61. Coarse sienite, (boulder,) Charlestown.
62. Micaceous sienite, Fall River, Troy.
63. Chiefly feldspar and mica, Bradford.
64. Sienite, chiefly feldspar, Lincoln.
65. Feldspar hornblende and mica, Salem.
66. Feldspar hornblende and talc, Newbury.
67. Feldspar quartz with talc, Franklin.
68. Granite, Stoughton.
69. Sienite, (same ledge as 68,) Stoughton.
70. Greenstone, (same ledge as 68,) Stoughton.
71. Porphyritic sienite, (smoothed,) Lexington.
72. Porphyritic sienite with epidote, (smoothed,) Marblehead.
73. Sienite with bronze-colored feldspar, Gloucester.
74. Porphyritic sienite, West Bridgewater.
75. Porphyritic sienite, Abington.
76. Porphyritic sienite, Abington.
77. Porphyritic sienite, Plymouth County.

78. Micaceous sienite, Essex.
79. Porphyritic sienite passing to greenstone, Waltham.
80. Conglomerated sienite, Whately.
81. Conglomerated sienite, Whately.
82. Conglomerated sienite, Whately.
83. Conglomerated sienite, Whately.
84. Junction of two varieties of sienite, West Bridgewater.
85. Graphic granite in sienite, Belchertown.
86. Compact feldspar in sienite, Southborough.
87. Granite vein in sienite, Northampton.
88. Greenstone vein in sienite, Nahant.
89. Feldspar veins in sienite, Marblehead.
90. Epidote vein in sienite, Abington.
91. Red feldspar vein in sienite, Whately.
92. Augite hornblende and feldspar, Belchertown.
93. Augite and feldspar, Amherst.
94. Heavy spar, Hatfield.
95. Fluorspar in sienite, Cumberland, Rhode Island.
96. Drury quartz, Whately.
97. Drury quartz, Whately.
98. Drury quartz, Whately.
99. Drury quartz with singular cavities, Whately.
100. Mispickel, Newbury.
101. Galena and blende in heavy spar, Hatfield.
102. Coarse sienite, Andover.
103. Coarse sienite, Beverly.
104. Coarse sienite, (boulder,) Newton.
105. Foliated hornblende, Beverly.
106. Sienite, East Bradford.
107. Sienite, Medford.
108. Foliated greenish sienite, Dedham.
109. Foliated greenish sienite, Cape Ann.
110. Sienite, Manomet Hill, Plymouth.
111. Sienite, with metallic mineral, Sharon.
112. Sienite, (feldspar greenish,) Foxborough.
113. Sienite, Hingham.
114. Sienite, (boulder,) Waltham.
115. Sienite, Scituate.
116. Sienite, Medfield, north-east part.
117. Sienite, Medfield, north-east part.
118. Sienite, Kingston.
119. Sienite, Kingston.
120. Sienite, Kingston.
121. Sienite, South Wrentham.
122. Sienite, Cohasset.
123. Sienite, Manomet Hill, Plymouth.
124. Sienite, (boulder,) East Middleborough.

125. Sienite, Railroad cut, Natick.
126. Sienite, Manomet Hill, Plymouth.
127. Sienite, (boulder,) Rochester.
128. Sienite, Hingham.
129. Sienite, Medfield.
130. Sienite, Railroad cut, Needham.
131. Sienite, Railroad cut, Natick.
132. Sienite, Medfield, north-east part.
133. Sienite, Medfield, north-east part.
134. Sienite, Manomet Hill, Plymouth.
135. Sienite, (boulder,) Hanover, (four corners.)
136. Sienite, Scituate.
137. Sienite, (boulder,) Pembroke.
138. Sienite, (boulder,) Pembroke.
139. Sienite, (boulder,) Pembroke.
140. Sienite, Kent's Island, Newbury.
141. Epidotic sienite, Railroad cut, Natick.
142. Sienite, Dedham.
143. Sienite, Sharon.
144. Sienite with red feldspar, Dedham.
145. Sienite with brown feldspar, Newbury.
146. Sienite with red feldspar, Plymouth.
147. Sienite, Sharon.
148. Sienite, (boulder,) Middleborough.
149. Porphyritic sienite, Beverly.
150. Sienite, Manomet Hill, Plymouth.
151. Sienite, Railroad cut, Natick.
152. Sienite, Railroad cut, Needham.
153. Sienite, Railroad cut, Natick.
154. Sienite, Railroad cut, Natick.
155. Sienite with mica, Belchertown.
156. Sienite with granite veins, (boulder,) Palmer.
157. Sienite with granite veins, (boulder,) Palmer.
158. Sienite with granite veins, (boulder,) Palmer.
159. Sienite with granite veins, (boulder,) Palmer.
160. Sienite with granite veins, (boulder,) Palmer.
161. Sienite, Ludlow.
162. Feldspar, Charlestown.
163. Specular iron, Dedham.
164. Quartz crystals in sienite, East Granby.
165. Prehnite in sienite, Charlestown.
166. Prehnite in sienite, Charlestown.
167. Prehnite with calcite, Charlestown.
168. Dendrite on sienite, Dedham, Pr. L. B. Larkin.
169. Sienite with hornblende crystals, North Scituate.
170. Sienite with hornblende crystals, North Scituate.
171. Sienite with hornblende crystals, North Scituate.

172. Sienite with hornblende crystals, North Scituate.
173. Sienite with hornblende crystals, North Scituate.

XIX. Granite.

1. Coarse granite, Russell.
2. Coarse granite, Westhampton.
3. Coarse granite, Southampton, (adit.)
4. Coarse granite, Leverett.
5. Coarse granite, Amherst.
6. Coarse granite, Amherst.
7. Coarse granite, Granville.
8. Granite, blue quartz, Amherst.
9. Granite, Westford.
10. Granite, Amherst.
11. Granite, mouth of Miller's River.
12. Granite, Framingham.
13. Granite, feldspar flesh-colored, Blandford.
14. Granite, feldspar red, Granville.
15. Granite, feldspar red, Amherst.
16. Granite, feldspar red, New Salem.
17. Granite, feldspar red, Concord.
18. Granite, quartz yellow, Williamsburg.
19. Granite, mica yellow, Chesterfield.
20. Granite, mica yellow, Norwich.
21. Easily decomposing granite boulders, Florida.
22. Granite, purplish quartz, Adams.
23. Granite, purplish quartz, Florida.
24. Coarse granite, mica green, Cummington.
25. Granite, quartz smoky gray, Leverett.
26. Granite, feldspar bluish, Leverett.
27. Granite, feldspar blue, Leverett.
28. Granite, feldspar compact, Heath.
29. Granite, feldspar compact, Amherst.
30. Granite, (gneiss ?) Ashburnham.
31. Granite, (gneiss ?) Granville.
32. Dark gray granite, Fall River.
33. Dark gray granite, (gneiss?) Leominster.
34. Dark gray granite, (gneiss?) Smithfield, Rhode Island.
35. Granite passing into sienite, Bristol, Rhode Island.
36. Junction of coarse and fine granite, Williamsburg.
37. Granite, (gneiss ?) top of Wachusett Mountain.
38. Quartz and mica, coarse, Westfield.
39. Fine grained granite, (boulder,) South Hadley.
40. Fine grained granite, (boulder,) South Hadley.
41. Fine grained granite, (boulder,) South Hadley.
42. Fine granite, feldspar red, (smoothed,) Falmouth.
43. Fine granite, feldspar red, (smoothed,) Rochester.

44. Fine granite, feldspar red, (smoothed,) Wareham.
45. Fine granite, feldspar reddish gray, (smoothed,) Framingham.
46. Fine granite, mica black, Cumberland, Rhode Island.
47. Fine granite, mica black, Cumberland, Rhode Island.
48. Granite with black mica, (smoothed,) Medfield.
49. Fine granite, Carver.
50. Feldspar quartz and mica or talc, Weston.
51. Feldspar quartz and mica or talc, east part of the State.
52. Fine grained granite, (boulder,) Adams.
53. Granite, feldspar purplish, Belchertown.
54. Granite, evidently decomposed from a vein, Westfield.
55. Fine grained granite, quarried, Ashburnham.
56. Granite with garnets, Acton.
57. Fine grained granite, Whately.
58. Fine grained granite, Conway.
59. Fine grained granite, Holliston.
60. Granite, chiefly quartz and feldspar, Dedham.
61. Granite, chiefly quartz and feldspar, Chester.
62. Granite, (smoothed,) Plymouth, Pilgrim rock.
63. Granite, Plymouth, Pilgrim rock.
64. Fine grained granite, Acton.
65. Granite, chiefly quartz, Sudbury.
66. Granite passing into porphyry, Halifax.
67. Feldspar quartz and talc, (?) Duxbury.
68. Perhaps Sienite, Newbury.
69. Granite apparently stratified, Worcester.
70. Granite passing into mica slate, Norwich.
71. Granite passing into mica slate, Colrain.
72. Granite, mica black, like sienite, (smoothed,) Dover.
73. Fine grained granite, Southampton, (adit.)
74. Granite, quarried, Tyngsborough.
75. Fine grained granite, Norwich.
76. Fine grained granite, wrought, Dover.
77. Granite, little mica, (smoothed,) Dover.
78. Fine grained granite, (boulder,) Amherst.
79. Quarried granite, (smoothed,) Concord.
80. Granite, feldsar reddish, (smoothed,) Waltham.
81. Granite, fine grained, decomposing, Sharon.
82. Granite, quarried, (Chelmsford granite,) Westford.
83. Granite, quarried, (smoothed,) Fitzwilliam, New Hampshire
84. Granite, wrought, porphyritic, Pelham, New Hampshire.
85. Granite, wrought, (smoothed,) Fitchburg.
86. Granite, wrought, (smoothed,) Ashby.
87. Granite, wrought, (smoothed,) Williamsburg.
88. Feldspar, quartz and talc, Dedham.
89. Granite resembling sienite, Cumberland, Rhode Island.
90. Granite with talc, (boulder,) Amherst.

91. Pseudomorphous granite, Williamsburg.
92. Porphyritic granite, Chester.
93. Porphyritic granite, (boulder,) Shutesbury.
94. Porphyritic granite, very coarse, Harvard.
95. Porphyritic granite, (smoothed,) (boulder,) Turner's Falls.
96. Granite, feldspar compact, Guilford, Vermont.
97. Granite, feldspar compact, Guilford, Vermont.
98. Compact feldspar and quartz, Guilford, Vermont.
99. Compact feldspar and quartz, Guilford, Vermont.
100. Graphic granite, Williamsburg.
101. Graphic granite, Williamsburg.
102. Graphic granite, Leominster.
103. Graphic granite, vein in quartz rock, Washington.
104. Graphic granite, Goshen.
105. Graphic granite, reddish, (boulder,) Amherst.
106. Graphic granite, flesh-red, from red sandstone, Deerfield.
107. Graphic granite, flesh-red, from red sandstone, Deerfield.
108. Graphic granite, Warwick.
109. Graphic granite with garnets, Goshen.
110. Junction of granite and mica slate, Conway.
111. Vein of granite in mica slate, Conway.
112. Vein of granite in mica slate, Williamsburg.
113. Vein of granite in Worcester county, mica slate, Leominster.
114. Granite junction with micaceous limestone, Conway.
115. Granite with mica slate nodule, (boulder,) Deerfield.
116. Heavy Spar, Leverett.
117. Heavy Spar, Leverett.
118. Calcite, Lead mine, Southampton.
119. Argentine, Westhampton.
120. Argentine, junction with granite, Westhampton.
121. Argentine, Lead mine, Southampton.
122. Crystallized quartz, Lead mine, Southampton.
123. Crystallized quartz, Lead mine, Southampton.
124. Crystallized quartz, Lead mine, Southampton.
125. Crystallized quartz, Lead mine, Southampton.
126. Radiated crystallized quartz, Southampton.
127. Purple quartz in granite, Florida.
128. Crystallized smoky quartz, Goshen.
129. Massive smoky quartz, Williamsburg.
130. Pseudomorphous quartz, form of calcite, Westhampton.
131. Pseudomorphous quartz, form of apatite, Westhampton.
132. Hornstone, Lead mine, Southampton.
133. Spodumene, Goshen.
134. Spodumene, Goshen.
135. Spodumene, rose color, Goshen.
136. Spodumene, green and translucent, Goshen.
137. Spodumene, white and pearly, Sterling.
138. Straw yellow mica, tourmaline locality, Chesterfield.

139. Crystallized mica, Goshen.
140. Rose colored mica, Goshen.
141. Prismatic mica, Russell.
142. Variegated prismatic mica, Russell.
143. Black mica, Russell.
144. Plumose mica, Williamsburg.
145. Tourmaline in granite, Chelmsford.
146. Indicolite, Goshen.
147. Indicolite, Goshen.
148. Light blue indicolite, Goshen.
149. Green tourmaline, Goshen.
150. Yellowish green tourmaline, Goshen.
151. Tourmaline, Chesterfield.
152. Green, red and blue tourmalines, Chesterfield.
153. Green tourmaline in quartz, Chesterfield.
154. Green tourmaline inclosing rabellite. Chesterfield.
155. Phenacite in granite, Goshen.
156. Rose red phenacite, Goshen.
157. Phenacite with spodumene, Goshen.
158. Phenacite, Goshen.
159. Stilbite, Goshen.
160. Fibrous talc, Norwich.
161. Fibrous talc, Blandford.
162. Common feldspar, Williamsburg.
163. Blue feldspar, Leverett.
164. Greenish feldspar, Goshen.
165. Foliated albite, (cleavandite,) Chesterfield.
166. Foliated albite, New Salem.
167. Coarsely granular albite, Chesterfield.
168. Finely granular albite, Goshen.
169. Galena in quartz, Southampton.
170. Galena with Blende, Whately.
171. Galena with carb. lead, Southampton.
172. Blende in quartz, Northampton.
173. Copper pyrites, Southampton.
174. Blende, galena, and copper pyrites, Southampton.
175. Decomposing blende in quartz, Williamsburg.
176. Granite with long mica prisms, Russell.
177. Coarse granite, Northfield.
178. Granite, South Mountain, Northfield.
179. Coarse granite, Irving.
180. Coarse granite, South Orange.
181. Granite with blue feldspar, Clappville, Leicester.
182. Graphic granite, Granby, south-east part.
183. Granite with yellowish feldspar, Brimfield.
184. Granite with blue feldspar, Hoosac Mountain.
185. Granite, Clarksburg, north-west part.

186. Fine grained granite, lilac, Three Rivers, Palmer.
187. Graphic granite, Sodom Mountain, Southwick.
188. Granite with red stripes, (boulder,) Watertown.
189. Granite, at the Furnace, Kingston.
190. Granite, Duxbury.
191. Granite, Groton, south-east part.
192. Red granite, Topsfield.
193. Granite, vein in mica slate, Athol.
194. Granite, coarse vein, Norwich.
195. Crystals of mica, Beryl locality, South Royalston.
196. Crystals of mica, Beryl locality, South Royalston.
197. Crystals of mica, Beryl locality, South Royalston.
198. Foliated mica, Railroad, Warren.
199. Rutile, Norwich.
200. Blende in quartz, Angell's mine, Norwich.
201. Drury quartz, Angell's mine, Norwich.
202. Drury quartz in galena vein, Russell, north-west part.
203. Drury quartz in galena vein, Russell, north-west part.
204. Crystallized quartz, Angell's mine, Norwich.
205. Crystallized quartz, Angell's mine, Norwich.
206. Crystallized quartz, Angell's mine, Norwich.
207. Crystallized quartz, Angell's mine, Norwich.
208. Crystallized quartz, Angell's mine, Norwich.
209. Crystallized quartz, Angell's mine, Norwich.
210. Crystallized quartz, Angell's mine, Norwich.
211. Crystallized quartz, Angell's mine, Norwich.
212. Garnet in feldspar, Beryl locality, Barre.
213. Crystal of feldspar, Beryl locality, South Royalston.
214. Beryls in quartz, South Royalston.
215. Beryls in quartz, South Royalston.
216. Beryl, South Royalston.
217. Beryl, South Royalston.
218. Beryl in the rock, South Royalston.
219. Beryl in the rock, South Royalston.
220. Beryl, cut and polished, South Royalston.
221. Beryl, specimen color of the crysolite, cut and polished, South Royalston.
222. Crichtonite, beryl, and cryst. mica, South Royalston.
223. Beryl in feldspar, West Barre.
224. Yellowish beryl, West Barre.
225. Rutile in granite, West Barre.
226. Rutile in granite, West Barre.
227. Variegated granite with red and gray feldspar, North Scituate.
228. Variegated granite, North Scituate.
229. Variegated granite, North Scituate.
230. Variegated granite, North Scituate.
231. Variegated granite, North Scituate.
232. Vein of red granite in sienite, Northampton.

CATALOGUE OF BIRDS

In the State Cabinet of Massachusetts under the direction of the Secretary of the State Board of Agriculture. Arranged according to the nomenclature and classification adopted by the Smithsonian Institution. January 1, 1859.

ORDER I. RAPTORES.

Family 2.—Falconidæ.

Genus Falco. Linn.

1. *Falco columbarius*, Linn. Pigeon Hawk. Male. Donated and prepared by Jonathan S. Leach.
2. *Falco columbarius*, Linn. Pigeon Hawk. Young female. Donated and prepared by Jonathan S. Leach.

Genus Astur. Lac.

3. *Astur atricapillus*, Bonap. Gos Hawk. Female. Donated and prepared by John W. P. Jenks.
4. *Astur atricapillus*, Bonap. Gos Hawk. Young male. Donated and prepared by Charles D. Lincoln.

Genus Accipiter. Briss.

5. *Accipiter fuscus*, Bon. Sharp-shinned Hawk. Male. Donated and prepared by Jonathan S. Leach.
6. *Accipiter fuscus*, Bon. Sharp-shinned Hawk. Young male. Donated and prepared by John W. P. Jenks.
7. *Accipiter fuscus*, Bon. Sharp-shinned Hawk. Young. Donated and prepared by Jonathan S. Leach.
8. *Accipiter fuscus*, Bon. Sharp-shinned Hawk. Young. Donated and prepared by Jonathan S. Leach.

Genus Buteo. Cuv.

9. *Buteo borealis*, Vieill. Red-tailed Hawk. Male. Donated and prepared by John W. P. Jenks.
10. *Buteo borealis*, Vieill. Red-tailed Hawk. Young male. Donated and prepared by Edward H. Lincoln.
11. *Buteo borealis*, Vieill. Red-tailed Hawk. Young male. Donated and prepared by Edward H. Lincoln.
12. *Buteo lineatus*, Jardine. Red-shouldered Hawk. Male. Donated and prepared by John W. P. Jenks.

13. *Buteo lineatus*, Jardine. Red-shouldered Hawk. Female. Donated and prepared by Charles D. Lincoln.
14. *Buteo lineatus*, Jardine. Red-shouldered Hawk. Young female. Donated by Theron C. Gray. Prepared by Francis E. Everett.

Genus Archibuteo. Brehm.

15. *Archibuteo lagopus*, Gray. Rough-legged Hawk. Female. Donated by Captain E. Howland. Prepared by John W. P. Jenks.
16. *Archibuteo sancti-johannis*, Gray. Black Hawk. Male. Donated by Captain E. Howland. Prepared by John W. P. Jenks.

Genus Circus. Lacep.

17. *Circus hudsonius*, Vieill. Marsh Hawk. Male. Donated and prepared by John W. P. Jenks.
18. *Circus hudsonius*, Vieill. Marsh Hawk. Young male. Donated and prepared by Jonathan S. Leach.
19. *Circus hudsonius*, Vieill. Marsh Hawk. Female. Donated and prepared by Charles D. Lincoln.

Genus Haliaetus. Sav.

20. *Haliaetus leucocephalus*, Savigny. Bald Eagle. Female. Donated by Charles G. Davis. Prepared by Francis E. Everett.

Genus Pandion. Sav.

21. *Pandion carolinensis*, Bon. Fish Hawk. Female. Donated by George D. Ruggles. Prepared by John W. P. Jenks.
22. *Pandion carolinensis*, Bon. Fish Hawk. Young female. Donated and prepared by Jonathan S. Leach.

FAMILY 3.—STRIGIDÆ.

Genus Bubo. Cuv.

23. *Bubo virginianus*, Bon. Great Horned Owl. Male. Donated by J. A. E. Loud. Prepared by John W. P. Jenks.
24. *Bubo virginianus*, Bon. Great Horned Owl. Male. Donated by Rowland Robinson. Prepared by John W. P. Jenks.
25. *Bubo virginianus*, Bon. Great Horned Owl. Male. Donated by J. Wilbur. Prepared by Francis E. Everett.
26. *Bubo virginianus*, Bon. Great Horned Owl. Female. Donated and prepared by Francis E. Everett.

Genus Scops. Sav.

27. *Scops asio*, Bonap. Mottled Owl. Male. Donated and prepared by John W. P. Jenks.
28. *Scops asio*, Bonap. Mottled Owl. Male. Donated and prepared by Francis E. Everett.

Genus Syrnium. Sav.

29. *Syrnium nebulosum*, Gray. Barred Owl. Female. Donated by Augustus Bunce. Prepared by Francis E. Everett.
30. *Syrnium nebulosum*, Gray. Barred Owl. Female. Donated and prepared by John W. P. Jenks.

Genus Nyctale. Brehm.

31. *Nyctale acadica*, Bon. Saw-whet Owl. Female. Donated and prepared by Charles D. Lincoln.

Genus Nyctea. Steph.

32. *Nyctea nivea*, Gray. Snowy Owl. Male. Donated by John Brooks, Jr. Prepared by Francis E. Everett.
33. *Nyctea nivea*, Gray. Snowy Owl. Female. Donated and prepared by John W. P. Jenks.

ORDER II. SCANSORES.

Family 6.—Cuculidæ.

Genus Coccygus. Vieill.

34. *Coccygus erythrophthalmus*, Bon. Black-billed Cuckoo. Male. Donated and prepared by Jonathan S. Leach.
35. *Coccygus erythrophthalmus*, Bon. Black-billed Cuckoo. Male. Donated and prepared by C. M. Fitch.
36. *Coccygus americanus*, Bonap. Yellow-billed Cuckoo. Male. Donated and prepared by John W. P. Jenks.

Family 7.—Picidæ.

Genus Picus. Linn.

37. *Picus villosus*, Linn. Hairy Woodpecker. Male. Donated and prepared by Francis E. Everett.
38. *Picus villosus*, Linn. Hairy Woodpecker. Female. Donated and prepared by Jonathan S. Leach.
39. *Picus pubescens*, Linn. Downy Woodpecker. Male. Donated and prepared by John W. P. Jenks.
40. *Picus pubescens*, Linn. Downy Woodpecker. Male. Donated and prepared by Edward H. Lincoln.
41. *Picus pubescens*, Linn. Downy Woodpecker. Female. Donated and prepared by Edward H. Lincoln.

Genus Colaptes. Sw.

42. *Colaptes auratus*, Sw. Golden-winged Woodpecker. Male. Donated and prepared by John W. P. Jenks.
43. *Colaptes auratus*, Sw. Golden-winged Woodpecker. Male. Donated and prepared by John W. P. Jenks.
44. *Colaptes auratus*, Sw. Golden-winged Woodpecker. Female. Donated and prepared by Edward H. Lincoln.

ORDER III. INSESSORES.

Family 11.—Cysselidæ.

Genus Chaetura. Steph.

45. *Chaetura pelasgia*, Steph. Chimney Swallow. Male. Donated and prepared by John W. P. Jenks.
46. *Chaetura pelasgia*, Steph. Chimney Swallow. Female. Donated and prepared by Jonathan S. Leach.

Family 12.—Caprimulgidæ.

Genus Antrostomus. Gould.

47. *Antrostomus vociferus*, Bonap. Whip-poor-Will. Female. Donated and prepared by Francis E. Everett.

Genus Chordeiles. Sw.

48. *Chordeiles popetue*, Baird. Night Hawk. Male. Donated by A. H. Alden. Prepared by John W. P. Jenks.
49. *Chordeiles popetue*, Baird. Night Hawk. Female. Donated by C. A. Covell. Prepared by John W. P. Jenks.

Family 13.—Alcedinidæ.

Genus Ceryle. Boie.

50. *Ceryle alcyon*, Boie. Belted King-fisher. Male. Donated and prepared by Francis E. Everett.
51. *Ceryle alcyon*, Boie. Belted King-fisher. Female. Donated and prepared by Jonathan S. Leach.
52. *Ceryle alcyon*, Boie. Belted King-fisher. Young. Donated by John W. P. Jenks. Prepared by C. A. Covell.

Family 15.—Colopteridæ.

Genus Tyrannus. Cuv.

53. *Tyrannus carolinensis*, Baird. King Bird. Male. Donated and prepared by John W. P. Jenks.

Genus Myiarchus. Cab.

54. *Myiarchus crinitus*, Cab. Great Crested Flycatcher. Male. Donated and prepared by Francis E. Everett.

Genus Contopus. Cab.

55. *Contopus borealis*, Baird. Olive-sided Flycatcher. Male. Donated and prepared by Charles D. Lincoln.
56. *Contopus virens*, Cab. Wood Pewee. Male. Donated and prepared by Francis E. Everett.

Family 16.—Turdidæ.

Genus Turdus. Linn.

57. *Turdus pallasi*, Cab. Hermit Thrush. Male. Donated and prepared by Francis E. Everett.

Genus Sialia. Sw.

58. *Sialia sialis*, Baird. Blue Bird. Male. Donated by A. H. Alden. Prepared by John W. P. Jenks.
59. *Sialia sialis*, Baird. Blue Bird. Female. Donated and prepared by Charles D. Lincoln.

Genus Regulus. Cuv.

60. *Regulus satrapa*, Licht. Golden-crested Wren. Male. Donated and prepared by John W. P. Jenks.
61. *Regulus satrapa*, Licht. Golden-crested Wren. Female. Donated and prepared by Francis E. Everett.

62. *Regulus satrapa*, Licht. Golden-crested Wren. Female. Donated and prepared by Jonathan S. Leach.

Family 17.—Sylvicolidæ.

Genus Mniotilta. Vieill.

63. *Mniotilta varia*, Vieill. Black and White Creeper. Male. Donated and prepared by Francis E. Everett.
64. *Mniotilta varia*, Vieill. Black and White Creeper. Female. Donated and prepared by Francis E. Everett.

Genus Parula. Bon.

65. *Parula americana*, Bonap. Blue Yellow-backed Warbler. Male. Donated and prepared by Francis E. Everett.
66. *Parula americana*, Bonap. Blue Yellow-backed Warbler. Female. Donated and prepared by Charles D. Lincoln.

Genus Helminthophaga. Cab.

67. *Helminthophaga ruficapilla*, Baird. Nashville Warbler. Male. Donated and prepared by Jonathan S. Leach.
68. *Helminthophaga ruficapilla*, Baird. Nashville Warbler. Male. Donated and prepared by Francis E. Everett.

Genus Seiurus. Sw.

69. *Seiurus aurocapillus*, Sw. Golden-crowned Thrush. Male. Donated and prepared by Francis E. Everett.
70. *Seiurus noveboracensis*, Nutt. Water Thrush. Male. Donated and prepared by Francis E. Everett.

Genus Dendroica. Gray.

71. *Dendroica virens*, Baird. Black-throated Green Warbler. Male. Donated and prepared by Francis E. Everett.
72. *Dendroica virens*, Baird. Black-throated Green Warbler. Female. Donated and prepared by Charles D. Lincoln.
73. *Dendroica canadensis*, Baird. Black-throated Blue Warbler. Male. Donated and prepared by Francis E. Everett.
74. *Dendroica coronata*, Gray. Yellow Rump. Male. Donated and prepared by Francis E. Everett.
75. *Dendroica coronata*, Gray. Yellow Rump. Fall male. Donated and prepared by Francis E. Everett.
76. *Dendroica coronata*, Gray. Yellow Rump. Female. Donated and prepared by Francis E. Everett.
77. *Dendroica pinus*, Baird. Pine Creeping Warbler. Male. Donated and prepared by Francis E. Everett.
78. *Dendroica pinus*, Baird. Pine Creeping Warbler. Male. Donated and prepared by Charles D. Lincoln.
79. *Dendroica pinus*, Baird. Pine Creeping Warbler. Young male. Donated and prepared by Charles D. Lincoln.
80. *Dendroica pennsylvanica*, Baird. Chestnut-sided Warbler. Male. Donated and prepared by Francis E. Everett.
81. *Dendroica pennsylvanica*, Baird. Chestnut-sided Warbler. Young. Donated and prepared by Charles D. Lincoln.

82. *Dendroica striata*, Baird. Black Poll Warbler. Female. Donated and prepared by Francis E. Everett.

83. *Dendroica æstiva*, Baird. Yellow Warbler. Male. Donated and prepared by Jonathan S. Leach.

84. *Dendroica palmarum*, Baird. Yellow Red Poll. Male. Donated and prepared by Charles D. Lincoln.

85. *Dendroica palmarum*, Baird. Yellow Red Poll. Young. Donated and prepared by Charles D. Lincoln.

86. *Dendroica discolor*, Baird. Prairie Warbler. Male. Donated and prepared by Francis E. Everett.

Genus Myodoictes. Aud.

87. *Myiodoictes canadensis*, Aud. Canada Flycatcher. Male. Donated and prepared by Charles D. Lincoln.

Genus Pyranga. Vieill.

88. *Pyranga rubra*, Vieill. Scarlet Tanager. Male. Donated and prepared by John W. P. Jenks.

89. *Pyranga rubra*, Vieill. Scarlet Tanager. Variety male. Donated and prepared by Francis E. Everett.

90. *Pyranga rubra*, Vieill. Scarlet Tanager. Variety male. Donated and prepared by Francis E. Everett.

91. *Pyranga rubra*, Vieill. Scarlet Tanager. Female. Donated and prepared by Francis E. Everett.

Family 18.—Hirundinidæ.

Genus Hirundo, Linn.

92. *Hirundo horreorum*, Barton. Barn Swallow. Male. Donated and prepared by Francis E. Everett.

93. *Hirundo lunifrons*, Say. Cliff Swallow. Male. Donated by A. H. Alden. Prepared by John W. P. Jenks.

94. *Hirundo lunifrons*, Say. Cliff Swallow. Female. Donated by A. H. Alden. Prepared by John W. P. Jenks.

Genus Progne. Boie.

95. *Progne purpurea*, Boie. Purple Martin. Male. Donated and prepared by Jonathan S. Leach.

96. *Progne purpurea*, Boie. Purple Martin. Male. Donated and prepared by Francis E. Everett.

Family 19.—Bombycillidæ.

Genus Ampelis. Linn.

97. *Ampelis cedrorum*, Baird. Cedar Bird. Male. Donated and prepared by Francis E. Everett.

Family 20.—Laniidæ.

Genus Collyrio. Moehr.

98. *Collyrio borealis*, Baird. Great Northern Shrike. Male. Donated and prepared by Francis E. Everett.

99. *Collyrio borealis*, Baird. Great Northern Shrike. Male. Donated and prepared by Jonathan S. Leach.

100. *Collyrio borealis*, Baird. Great Northern Shrike. Male. Donated and prepared by John W. P. Jenks.

Genus Vireo. Vieill.

101. *Vireo olivaceus*, Vieill. Red-eyed Flycatcher. Male. Donated and prepared by Francis E. Everett.

102. *Vireo solitarius*, Vieill. Blue-headed Flycatcher. Male. Donated and prepared by Francis E. Everett.

Family 21.—Liotrichidæ.

Genus Mimus. Boie.

103. *Mimus carolinensis*, Gray. Cat Bird. Male. Donated and prepared by Francis E. Everett.

Genus Harporhyncus. Cab.

104. *Harporhynchus rufus*, Cab. Brown Thrush. Male. Donated and prepared by John W. P. Jenks.

Genus Cistothorus. Cab.

105. *Cistothorus stellaris*, Cab. Short-billed Marsh Wren. Male. Donated and prepared by Francis E. Everett.

Genus Troglodytes. Vieill.

106. *Troglodytes ædon*, Vieill. House Wren. Male. Donated and prepared by Francis E. Everett.

Family 22.—Certhiadæ.

Genus Certhia. Linn.

107. *Certhia americana*, Bonap. American Creeper. Male. Donated and prepared by Jonathan S. Leach.

108. *Certhia americana*, Bonap. American Creeper. Male. Donated and prepared by Francis E. Everett.

Genus Sitta. Linn.

109. *Sitta carolinensis*, Gm. White-bellied Nuthatch. Male. Donated and prepared by Jonathan S. Leach.

110. *Sitta canadensis*, Linn. Red-bellied Nuthatch. Male. Donated and prepared by Francis E. Everett.

Family 23.—Paridæ.

Genus Parus. Linn.

111. *Parus atricapillus*, Linn. Black-cap Titmouse. Male. Donated and prepared by John W. P. Jenks.

Family 25.—Alaudidæ.

Genus Eremophila. Boie.

112. *Eremophila cornuta*, Boie. Sky Lark. Male. Donated and prepared by Charles D. Lincoln.

Family 26.—Fringillidæ.

Genus Carpodacus Kaup.

113. *Carpodacus purpureus*, Gray. Purple Finch. Male. Donated and prepared by John W. P. Jenks.

114. *Carpodacus purpureus*, Gray. Purple Finch. Female. Donated and prepared by John W. P. Jenks.

Genus Chrysomitris. Boie.

115. *Chrysomitris tristis*, Bon. Yellow Bird. Male. Donated and prepared by Edward H. Lincoln.
116. *Chrysomitris tristis*, Bon. Yellow Bird. Winter male. Donated and prepared by Francis E. Everett.
117. *Chrysomitris pinus*, Bon. Pine Finch. Male. Donated and prepared by Charles D. Lincoln.

Genus Curvirostra. Scop.

118. *Curvirostra leucoptera*, Wils. White-winged Crossbill. Male. Donated and prepared by Edward H. Lincoln.
119. *Curvirostra leucoptera*, Wils. White-winged Crossbill. Female. Donated and prepared by Edward H. Lincoln.

Genus Ægiothus. Cab.

120. *Ægiothus linaria*, Cab. Lesser Redpoll. Male. Donated and prepared by Charles D. Lincoln.
121. *Ægiothus linaria*, Cab. Lesser Redpoll. Female. Donated and prepared by Edward H. Lincoln.

Genus Plectrophanes. Mey.

122. *Plectrophanes nivalis*, Meyer. Snow Bunting. Male. Donated and prepared by John W. P. Jenks.
123. *Plectrophanes nivalis*, Meyer. Snow Bunting. Male. Donated and prepared by Francis E. Everett.

Genus Passerculus. Bon.

124. *Passerculus savanna*, Bon. Savannah Sparrow. Male. Donated and prepared by Francis E. Everett.
125. *Passerculus savanna*, Bon. Savannah Sparrow. Male. Donated and prepared by Charles D. Lincoln.

Genus Pooecetes. Baird.

126. *Pooecetes gramineus*, Baird. Grass Finch. Male. Donated and prepared by Jonathan S. Leach.

Genus Coturniculus. Bon.

127. *Coturniculus passerinus*, Bon. Yellow-winged Sparrow. Male. Donated and prepared by Francis E. Everett.

Genus Zonotrichia. Sw.

128. *Zonotrichia albicollis*, Bon. White-throated Sparrow. Male. Donated and prepared by Edward H. Lincoln.
129. *Zonotrichia albicollis*, Bon. White-throated Sparrow. Fall male. Donated and prepared by Francis E. Everett.

Genus Junco. Wagler.

130. *Junco hyemalis*, Sclat. Snow Bird. Male. Donated and prepared by John W. P. Jenks.
131. *Junco hyemalis*, Sclat. Snow Bird. Male. Donated and prepared by Jonathan S. Leach.

132. *Junco monticola*, Baird. Tree Sparrow. Male. Donated and prepared by John W. P. Jenks.

Genus Melospiza. Bd.

133. *Melospiza melodia*, Baird. Song Sparrow. Male. Donated and prepared by John W. P. Jenks.
134. *Melospiza melodia*, Baird. Song Sparrow. Male. Donated and prepared by Edward H. Lincoln.
135. *Melospiza melodia*, Baird. Song Sparrow. Female. Donated and prepared by Francis E. Everett.
136. *Melospiza palustris*, Baird. Swamp Sparrow. Male. Donated and prepared by Francis E. Everett.
137. *Melospiza palustris*, Baird. Swamp Sparrow. Male. Donated and prepared by John W. P. Jenks.

Genus Passerella. Sw.

138. *Passerella iliaca*, Sw. Fox-colored Sparrow. Male. Donated and prepared by John W. P. Jenks.
139. *Passerella iliaca*, Sw. Fox-colored Sparrow. Male. Donated and prepared by Jonathan S. Leach.

Genus Guiraca. Sw.

140. *Guiraca ludoviciana*, Sw. Rose-breasted Grosbeak. Male. Donated and prepared by Francis E. Everett.
141. *Guiraca ludoviciana*, Sw. Rose-breasted Grosbeak. Female. Donated and prepared by Francis E. Everett.

Genus Pipilo. Vieill.

142. *Pipilo erythrophthalmus*, Vieill. Ground Robin. Male. Donated by W. W. Carruth. Prepared by John W. P. Jenks.

FAMILY 27.—ICTERIDÆ.

Genus Dolychonyx. Sw.

143. *Dolichonyx oryzivorus*, Sw. Boblink. Male. Donated and prepared by Jonathan S. Leach.
144. *Dolichonyx oryzivorus*, Sw. Boblink. Male. Donated and prepared by John W. P. Jenks.
145. *Dolichonyx oryzivorus*, Sw. Boblink. Female. Donated and prepared by John W. P. Jenks.

Genus Molothus. Sw.

146. *Molothus pecoris*, Sw. Cow Bird. Male. Donated and prepared by Francis E. Everett.
147. *Molothus pecoris*, Sw. Cow Bird. Female. Donated and prepared by Francis E. Everett.
148. *Molothus pecoris*, Sw. Cow Bird. Female. Donated and prepared by Edward H. Lincoln.

Genus Agelaius. Vieill.

149. *Agelaius phœniceus*, Vieill. Swamp Blackbird. Young male. Donated and prepared by Charles D. Lincoln.
150. *Agelaius phœniceus*, Vieill. Swamp Black Bird. Young male. Donated and prepared by Francis E. Everett.

151. *Agelaius phœniceus*, Vieill. Swamp Black Bird. Female. Donated by W. W. Carruth. Prepared by John W. P. Jenks.

152. *Agelaius phœniceus*, Vieill. Swamp Black Bird. Female. Donated and prepared by Jonathan S. Leach.

Genus Sturnella. Vieill.

153. *Sturnella magna*, Sw. Meadow Lark. Male. Donated and prepared by John W. P. Jenks.

154. *Sturnella magna*, Sw. Meadow Lark. Female. Donated and prepared by Charles D. Lincoln.

Genus Icterus. Daud.

155. *Icterus baltimore*, Daudin. Baltimore Oriole. Male. Donated by W. W. Carruth. Prepared by John W. P. Jenks.

156. *Icterus baltimore*, Daudin. Baltimore Oriole. Male. Donated and prepared by John W. P. Jenks.

157. *Icterus baltimore*, Daudin. Baltimore Oriole. Female. Donated by W. W. Carruth. Prepared by John W. P. Jenks.

158. *Icterus baltimore*, Daudin. Baltimore Oriole. Young male. Donated and prepared by Francis E. Everett.

159. *Icterus baltimore*, Daudin. Baltimore Oriole. Young female. Donated and prepared by John W. P. Jenks.

160. *Icterus baltimore*, Daudin. Baltimore Oriole. Young female. Donated and prepared by John W. P. Jenks.

Genus Scolecophagus. Sw.

161. *Scolecophagus ferrugineus*, Sw. Rusty Blackbird. Male. Donated and prepared by Francis E. Everett.

Family 28.—Corvidæ.

Genus Corvus. Linn.

162. *Corvus americanus*, Aud. Common Crow. Male. Donated and prepared by John W. P. Jenks.

163. *Corvus americanus*, Aud. Common Crow. Male. Donated by John Dean, Jr. Prepared by Francis E. Everett.

Genus Cyanura. Sw.

164. *Cyanura cristata*, Sw. Blue Jay. Male. Donated and prepared by Jonathan S. Leach.

165. *Cyanura cristata*, Sw. Blue Jay. Female. Donated and prepared by Edward H. Lincoln.

ORDER IV.

Family 29.—Columbidæ.

Genus Ectopistes. Sw.

166. *Ectopistes migratoria*, Sw. Wild Pigeon. Male. Donated and prepared by Edward H. Lincoln.

167. *Ectopistes migratoria*, Sw. Wild Pigeon. Female. Donated and prepared by Edward H. Lincoln.

168. *Ectopistes migratoria*, Sw. Wild Pigeon. Young. Donated and prepared by Edward H. Lincoln.

Genus Zenaidura. Bon.

169. *Zenaidura carolinensis*, Bon. Common Dove. Young. Donated by A. G. Pickens. Prepared by John W. P. Jenks.

FAMILY 32.—TETRAONIDÆ.

Genus Cupidonia. Reich.

170. *Cupidonia cupido*, Baird. Prairie Hen. Male. Donated and prepared by John W. P. Jenks.
171. *Cupidonia cupido*, Baird. Prairie Hen. Female. Donated and prepared by John W. P. Jenks.

Genus Bonasa. Steph.

172. *Bonasa umbellus*, Steph. Ruffed Grouse. Male. Donated by C. M. Fitch. Prepared by Francis E. Everett.
173. *Bonasa umbellus*, Steph. Ruffed Grouse. Male. Donated and prepared by John W. P. Jenks.
174. *Bonasa umbellus*, Steph. Ruffed Grouse. Male. Donated and prepared by Jonathan S. Leach.

ORDER V. GRALLATORES.

FAMILY 36.—ARDEIDÆ.

Genus Ardea. Linn.

175. *Ardea herodias*, Linn. Great Blue Heron. Male. Donated and prepared by John W. P. Jenks.
176. *Ardea herodias*, Linn. Great Blue Heron. Young. Donated by Capt. Edward W. Gardner. Prepared by Francis E. Everett.

Genus Botaurus. Steph.

177. *Botaurus lentiginosus*, Steph. Bittern. Female. Donated and prepared by John W. P. Jenks.

Genus Butorides. Blyth.

178. *Butorides virescens*, Bon. Green Heron. Male. Donated by A. C. Vaughan. Prepared by John W. P. Jenks.

FAMILY 40. CHARADRIDÆ.

Genus Charadrius. Linn.

179. *Charadrius virginicus*, Borck. Golden Plover. Female. Donated and prepared by Francis E. Everett.

Genus Squatarola. Cuv.

180. *Squatarola helvetica*, Cuv. Black-bellied Plover. Young. Donated and prepared by Francis E. Everett.

FAMILY 41.—HÆMATOPODIDÆ.

Genus Strepsilas. Ill.

181. *Strepsilas interpres*, Illig. Turnstone. Male. Donated by O. W. Almy. Prepared by John W. P. Jenks.

Family 44. Scolopicidæ.

Genus Philohela. Gray.

182. *Philohela minor*, Gray. American Woodcock. Male. Donated and prepared by Francis E. Everett.

Genus Gallinago. Leach.

183. *Gallinago wilsonii*, Bon. English Snipe. Male. Donated and prepared by Francis E. Everett.
184. *Gallinago wilsonii*, Bon. English Snipe. Female. Donated and prepared by Jonathan S. Leach.

Genus Macrorhamphus. Leach.

185. *Macrorhamphus griseus*, Leach. Red-breasted Snipe. Male. Donated by Francis E. Everett. Prepared by John W. P. Jenks.

Genus Tringa. Linn.

186. *Tringa maculata*, Vieill. Jack Snipe. Male. Donated by Francis E. Everett. Prepared by John W. P. Jenks.
187. *Tringa alpina*, Cassin. Red-backed Sandpiper. Male. Donated by Francis E. Everett. Prepared by John W. P. Jenks.
188. *Tringa wilsonii*, Nuttall. Least Sandpiper. Male. Donated by Francis E. Everett. Prepared by John W. P. Jenks.

Genus Calidris. Cuv.

189. *Calidris arenaria*, Illiger. Sanderling. Male. Donated and prepared by Francis E. Everett.

Genus Symphemia. Raf.

190. *Symphemia semipalmata*, Hautlaub. Willet. Male. Donated by Francis E. Everett. Prepared by John W. P. Jenks.

Genus Gambetta. Kaup.

191. *Gambetta melanoleuca.* Bon. Tell-tale Stone Snipe. Male. Donated and prepared by Jonathan S. Leach.
192. *Gambetta flavipes*, Bon. Yellow Legs. Male. Donated and prepared by Francis E. Everett.

Genus Rhyacophilus. Kp.

193. *Rhyacophilus solitarius*, Bon. Solitary Sandpiper. Male. Donated and prepared by Francis E. Everett.
194. *Rhyacophilus solitarius*, Bon. Solitary Sandpiper. Male. Donated and prepared by Jonathan S. Leach.

Genus Numenius. Linn.

195. *Numenius longirostris*, Wilson. Long-billed Curlew. Male. Donated and prepared by Francis E. Everett.

Family 45. Rallidæ.

Genus Porgana. Vieill.

196. *Porgana carolina*, Vieill. Common Rail. Male. Donated and prepared by Francis E. Everett.
197. *Porgana carolina*, Vieill. Common Rail. Male. Donated and prepared by Jonathan S. Leach.
198. *Porgana carolina*, Vieill. Common Rail. Female. Donated by John W. P. Jenks. Prepared by C. A. Covell.

Genus Fulica. Linn.

199. *Fulica americana*, Cumelin. Coot. Male. Donated by A. C. Vaughan. Prepared by John W. P. Jenks.

200. *Fulica americana*, Cumelin. Coot. Female. Donated by A. C. Vaughan. Prepared by John W. P. Jenks.

201. *Fulica americana*, Cumelin. Coot. Young. Donated by J. H. Jenks. Prepared by Francis E. Everett.

ORDER VI. NATATORES.

Family 46. Anatidæ.

Genus Bernicla. Steph.

202. *Bernicla canadensis*, Boie. Canada Goose. Male. Donated and prepared by John W. P. Jenks.

203. *Bernicla canadensis*, Boie. Canada Goose. Female. Donated and prepared by John W. P. Jenks.

204. *Bernicla brenta*, Steph. Brant. Male. Donated and prepared by Francis E. Everett.

Genus Anas. Linn.

205. *Anas obscura*, Cum. Black Duck. Male. Donated and prepared by Charles D. Lincoln.

206. *Anas obscura*, Cum. Black Duck. Female. Donated and prepared by Francis E. Everett.

Genus Dafila. Leach.

207. *Dafila acuta*, Jenyns. Pin-tail. Male. Donated and prepared by John W. P. Jenks.

Genus Querquedula. Steph.

208. *Querquedula discors*, Steph. Blue-winged Teal. Male. Donated by J. H. Jenks. Prepared by Francis E. Everett.

Genus Aix. Boie.

209. *Aix sponsa*, Boie. Summer Duck. Male. Donated and prepared by John W. P. Jenks.

Genus Fulix. Sund.

210. *Fulix marila*, Baird. Scaup Duck. Male. Donated and prepared by Francis E. Everett.

Genus Aythya. Boie.

211. *Aythya americana*, Bon. Red-Head. Male. Donated and prepared by John W. P. Jenks.

Genus Bucephala. Bd.

212. *Bucephala americana*, Baird. Golden Eye. Male. Donated and prepared by John W. P. Jenks.

213. *Bucephala albeola*, Baird. Butter Ball. Male. Donated and prepared by John W. P. Jenks.

214. *Bucephala albeola*, Baird. Butter Ball. Female. Donated and prepared by Jonathan S. Leach.

Genus Harelda. Leach.

215. *Harelda glacialis*, Leach. South Southerly. Male. Donated and prepared by John W. P. Jenks.

216. *Harelda glacialis*, Leach. South Southerly. Female. Donated and prepared by Jonathan S. Leach.

Genus Melanetta. Boie.

217. *Melanetta velvetina*, Baird. Velvet Duck. Male. Donated and prepared by Francis E. Everett.

218. *Melanetta velvetina*, Baird. Velvet Duck. Young male. Donated and prepared by John W. P. Jenks.

Genus Pelionetta. Kaup.

219. *Pelionetta perspicillata*, Kaup. Surf Duck. Male. Donated and prepared by Francis E. Everett.

220. *Pelionetta perspicillata*, Kaup. Surf Duck. Young. Donated and prepared by Francis E. Everett.

Genus Oidemia. Flem.

221. *Oidemia americana*, Swain. Scoter. Young. Donated and prepared by Jonathan S. Leach.

Genus Somateria. Leach.

222. *Somateria molissima*, Leach. Eider Duck. Male. Donated and prepared by John W. P. Jenks.

223. *Somateria molissima*, Leach. Eider Duck. Female. Donated and prepared by John W. P. Jenks.

224. *Somateria spectabilis*, Leach. King Eider. Young male. Donated and prepared by John W. P. Jenks.

225. *Somateria spectabilis*, Leach. King Eider. Young female. Donated and prepared by John W. P. Jenks.

Genus Mergus. Linn.

226. *Mergus serrator*, Linn. Red-breasted Merganser. Male. Donated and prepared by Francis E. Everett.

227. *Mergus* ——, Linn. Rose-breasted Merganser. Donated by Charles W. Lovett. Prepared by Francis E. Everett.

Genus Lophodytes. Reich.

228. *Lophodytes cucculatus*, Reich. Hooded Merganser. Female. Donated and prepared by John W. P. Jenks.

Genus Sula. Briss.

229. *Bassana sula*, Briss. Common Gannett. Male. Donated and prepared by John W. P. Jenks.

FAMILY 54.—LARIDÆ.

Genus Larus. Linn.

230. *Larus argentatus*, Brünn. Herring Gull. Male. Donated and prepared by Francis E. Everett.

Genus Chroicocephala. Eyton.

231. *Chroicocephala philadelphia*, Lawrence. Bonaparte's Gull. Male. Donated and prepared by Francis E. Everett.

232. *Chroicocephala philadelphia*, Lawrence. Bonaparte's Gull. Young. Donated and prepared by John W. P. Jenks.

Genus Rissa. Leach.

233. *Rissa tridactyla*, Bonap. Kittiwake Gull. Donated and prepared by John W. P. Jenks.

Genus Sterna. Linn.

234. *Sterna prenata*, Gambel. Least Tern. Donated and prepared by Charles D. Lincoln.

235. *Sterna Wilsonii*, Bon. Wilson's Tern. Donated by C. A. Covell. Prepared by John W. P. Jenks.

236. *Sterna Wilsonii*, Bon. Wilson's Tern. Donated by C. A. Covell. Prepared by John W. P. Jenks.

FAMILY 55.—COLYMBIDÆ.

Genus Colymbus. Linn.

237. *Colymbus torquatus*, Brünn. Loon. Young. Donated and prepared by Francis E. Everett.

238. *Colymbus septrionalis*, Linn. Red-throated Loon. Young. Donated and prepared by Francis E. Everett.

239. *Colymbus septrionalis*, Linn. Red-throated Loon. Young. Donated and prepared by John W. P. Jenks.

Genus Podiceps. Lath.

240. *Podiceps cornutus*, Lath. Horned Grebe. Young. Donated and prepared by John W. P. Jenks.

Genus Podylimbus. Less.

241. *Podylimbus podiceps*, Lawr. Pied-bellied Grebe. Male. Donated and prepared by John W. P. Jenks.

242. *Podylimbus podiceps*, Lawr. Pied-bellied Grebe. Young. Donated and prepared by John W. P. Jenks.

FAMILY 56.—ALCIDÆ.

Genus Uria. Moehring.

243. *Uria grylle*, Lath. Guillemot. Winter male. Donated and prepared by John W. P. Jenks.

244. *Uria lomvia*, Brünn. Foolish Guillemot. Male. Donated and prepared by John W. P. Jenks.

MISCELLANEOUS.

245. Java Game Cock. Donated and prepared by John W. P. Jenks.

CATALOGUE OF SHELLS

Deposited in the State Cabinet, by Samuel Tufts, Jr.

CLASS CONCHIFERA.

Family Tubicolaria.

Genus Teredo—(ship worm.)

26. T. navalis.

Family Pholadaria.

Genus Pholas.

27. P. costata.
11. P. crispata.

Family Solenacea.

Genus Solen—(Razor shell.)

28. S. ensis.

Genus Solecurtus.

30. S. caribbæus.

Genus Machæra.

33. M. nitida.
34. M. costata.

Genus Solemya.

35. S. velum.
36. S. borealis.

Genus Glycymeris.

39. G. siliqua, (bank clam.)

Family Myaria.

Genus Mya.

40. M. arenaria, (common clam.)
42. M. truncata.

Genus Corbula.

43. C. contracta.

Genus Pandora.

44. P. trilineata.

Family Osteodesmacea.

Genus Lyonsia.

46. O. hyalina.

Genus Anatina.

47. A. papyracea.

Genus Cochlodesma.

49. C. Leana.

Genus Thracia.

50. T. Conradi.
23. T. Couthouyi, (Stimpson's Shells of New England.)
22. T. truncata.

Family Mactracea.

Genus Mactra.

51. M. solidissima, (great sea clam—hen clam.)
53. M. ovalis.
54. M. lateralis.

Genus Mesodesma.

57. M. arctata.
58. M. Jauresii.

Genus Montacuta.

59. M. bidentata.

Genus Kellia.

60. K. rubra.

Family Lithophagidæ.

Genus Saxicava.

61. S. distorta.
25. S. rugosa. Stimpson.

Genus Petricola.

63. P. pholadiformis.

Family Nymphacea.

Genus Sanguinolaria.

66. S. fusca.
67. S. sordida.

Genus Tellina.

67. T. tenta.
68. T. tenera.

Genus Lucina.

69. L. radula.
71. L. flexuosa.

FAMILY CONCHACEA.

Genus Cyclas.

72. C. partumeia.
74. C. elegans.

Genus Pisidium.

75. P. dubium.

Genus Astarte—(Sea-chestnut.)

76. A. castanea.
78. A. sulcata.
80. A. lactea.
81. A. quadrans.

Genus Cyprina — (Quahog of the North Shore.)

82. C. Islandica.

Genus Cytherea.

84. C. convexa.

Genus Venus—(Quahog of Cape Cod.)

85. V. mercenaria.
86. V. notata.
88. V. gemma.

FAMILY CARDIACEA.

Genus Cardium—(Heart shells.)

89. C. Islandicum.
90. C. pinnulatum.
91. C. Mortoni.
92. C. Grœnlandicum.

Genus Cardita.

94. C. borealis.

FAMILY ARCACEA—(Ark shells.)

Genus Arca.

95. A. pexata.
96. A. transversa.

Genus Nucula.

97. N. thraciæformis.
98. N. limatula.
99. N. myalis.
100. N. sapotilla.
101. N. minuta.
102. N. Jacksonii.
103. N. proxima.
105. N. tenuis.

FAMILY NAIADES.—(Fresh water clams.)

Genus Unio.

107. U. complanatus.
109. U. nasutus.
110. U. radiatus.
111. U. cariosus.
112. U. ochraceus.

Genus Alasmodon.

113. A. arcuata.
115. A. undulata.
116. A. marginata.

Genus Anodon.

117. A. fluviatilis.
118. A. implicata.
120. A. undulata.

FAMILY MYTILACEA.

Genus Mytilus.

121. M. edulis.

Genus Modiola.

123. M. modiolus, (horse muscle.)
125. M. plicatula, (marsh muscle.)
127. M. pectinula.
128. M. nexa.
129. M. discrepans.
130. M. discors.
131. M. glandula.

FAMILY PECTENIDES.

Genus Pecten—(Scallop shells.)

132. P. Magellanicus.
133. P. Islandicus.
134. P. concentricus.

FAMILY OSTREACEA-(Oyster tribe.)

Genus Ostrea.

137. O. borealis.

Genus Anomia—(Scale shells.)

138. A. ephippium.

FAMILY BRACHIOPODA.

Genus Terebratula.

141. T. caput serpentis, (snake's head)
142. T. psittacea.

CLASS GASTEROPODA.

FAMILY PHYLLIDIANA.

Genus Chiton—(Coat of mail shells.)

146. C. apiculatus.
148. C. fulminatus.
149. C. ruber.
150. C. albus.
151. C. Emersonianus.

Genus Lottia—(Jockey caps.)

153. L. testudinalis.
154. L. alveus.

FAMILY CIRROBRANCHIATA.

Genus Dentalium—(Sea-horns.)

155. D. dentale.

FAMILY CALYPTRACEA.

Genus Cemoria.

156. C. Noachina.

Genus Crepidula.

158. C. fornicata.
159. C. plana.
160. C. convexa.

FAMILY BULLEANA.

Genus Bulla.

162. B. insculpta.
163. B. hiemalis.
163. B. Gouldii.
164. B. debilis.
165. B. triticea.
166. B. canaliculata.
167. B. obstricta.
168. B. oryza.
169. B. lineolata.

FAMILY COLIMACEA—(Land snails.)

Genus Helix.

170. H. albolabris.
171. H. thyroidus.
172. H. hortensis.
173. H. tridentata.
174. H. monodon.
175. H. hirsuta.
176. H. pulchella.
177. H. alternata.
178. H. striatella.
179. H. lineata.
180. H. cellaria.
181. H. indentata.
182. H. arborea.
184. H. labyrinthica.
185. H. chersina.

Genus Pupa.

P. ——— ?
P. ——— ?

Genus Bulimus.

193. B. lubricus.

Genus Succinea.

194. S. ovalis.
195. S. obliqua.
196. S. avara.

Genus Auricula.

197. A. bidentata.
199. A. denticulata.

FAMILY LIMNEANA—(Water snails.)

Genus Planorbis.

201. P. trivolvis.
202. P. lentus.
203. P. bicarinatus.
204. P. campanulatus.
205. P. armigerus.
206. P. hirsutus. = a[illegible] mi[illegible]
209. P. parvus.

Genus Physa.

211. P. heterostropha.
213. P. ancillaria.
214. P. elongata.

Genus Limnea.

215. L. columella.
217. L. macrostoma.
218. L. modicellus.
219. L. decidiosa.
221. L. elodes.

Genus Ancylus.

224. A. fuscus.
224. A. rivularis.

FAMILY PERISTOMATA.

Genus Valvata.

225. V. tricarinata.
226. V. pupoidea.

Genus Paludina.

227. P. decisa.

Genus Amnicola.

229. A. porata.

FAMILY NERITACEA.

Genus Natica.

231. N. heros, (cockle.)
233. N. triseriata.
234. N. immaculata.
235. N. canaliculata.
236. N. duplicata.
237. N. pusilla.
238. N. clausa.
239. N. flava.

Genus Janthina.

240. J. fragilis.

FAMILY MACROSTOMATA.

Genus Velutina.

241. V. lævigata.
242. V. zonata.

Genus Sigaretus.

244. S. haliotoideus.

FAMILY SCALARIANA.

Genus Vermetus—(Worm shell.)

246. V. lumbricalis.

Genus Scalaria.

249. S. Grœnlandica.

FAMILY TURBINACEA.

Genus Margarita—(Silver shells.)

252. M. cinerea.
253. M. obscura.
254. M. undulata.
255. M. arctica.
256. M. argentata.

Genus Littorina.

257. L. rudis.
259. L. tenebrosa.
260. L. palliata.

Genus Lacuna.

261. L. vincta.
263. Var. fusca.
263. L. neritoidea.

Genus Cingula.

265. C. minuta.
266. C. aculeus.

Genus Turritella.

267. T. erosa.
35. T. acicula, (Stimpson.)

Genus Pyramis.

269. P. striatula.

Genus Odostomia.

272. O. exigua.

FAMILY CANALIFERA.

Genus Cerithium.

275. C. Emersonii.
278. C. Sayii.
279. C. Greenii.

Genus Pleurotoma.

P. cerinum, (Stimpson, 49.)
280. P. decussata.

Genus Cancellaria.

283. C. Couthouyi.

Genus Fusus—(Spindle shells.)

284. F. Islandicus.
285. F. ventricosus.
287. F. decemcostatus.
288. F. scalariformis.
289. F. Bamffius.
290. F. rufus.
291. F. harpularius.
292. F. turricula.
293. F. muricatus.

Genus Pyrula.

294. P. canaliculata.
296. P. carica.

Genus Ranella.

297. R. caudata.

FAMILY ALATA.

Genus Rostellaria.

298. R. occidentalis.

FAMILY PURPURIFERA.

Genus Trichotropis.

300. T. borealis.

Genus Purpura.

301. P. lapillus.

Gen. Buccinum—(Winkle shells.)

303. B. plicosum.
304. B. Donovani.
305. B. undatum.
307. B. ciliatum.
308. B. obsoletum, (black dimity.)
309. B. trivittatum.
310. B. vibex.
311. B. rosaceum.
312. B. lunatum.

FAMILY COLUMELLARIA.

Genus Columbella.

313. C. avara.

CATALOGUE OF INSECTS

In the State Cabinet of Massachusetts, collected and presented by Mr. F. G. Sanborn.

I. COLEOPTERA.

INSECTS BENEFICIAL OR NOT INJURIOUS TO VEGETATION.

Cicindelidæ.—Tiger beetles.

1. Cicindela vulgaris. Common Tiger beetle.
2. Cicindela purpurea.
3. Cicindela patruela?
4. Cicindela rugifrons.
5. Cicindela rugifrons, var.
6. Cicindela sexguttata.
7. Cicindela punctulata.
8. Cicindela hirticollis.

Carabidæ.—Ground beetles.

9. Casnonia Pennsylvanica.
10. Galerita Americana.
11. Brachinus fumans.
12. Cymindis pilosus.
13. Agonum cupripenne.
14. Harpalus erraticus.
15. Harpalus bicolor.
16. Harpalus pleuriticus.
17. Adelosia muta.
18. Feronia adoxa.
19. Chlœnius emarginatus.
20. Chlœnius tomentosus.
21. Chlœnius sericeus.
22. Trechus cinctus.
23. Pangus caliginosus.
24. Calosoma punctata.
25. Carabus limbatus.
26. Carabus sylvosus.
27. Carabus vinctus.
28. Scaphinotus elevatus.
29. Sphæroderus bilobus.
37. And eight other species.

Dyticidæ.—Diving beetles.

48. Eleven species unnamed, (water beetles.)

Gyrinidæ—Whirligig beetles.

49. Gyrinus emarginatus.
50. Gyrinus Americanus.

Silphadæ.—Carrion beetles.

51. Necrophagus Americana, (American burying beetle.)
52. Necrophagus pygmæus.
53. Necrophagus tomentosus.
54. Necrophagus orbicollis.
55. Necrodes Surinamensis.
56. Silpha Americana.
57. Silpha inequalis.
58. Silpha caudata.

Engidæ.—Narrow beetles.

59. Dermestes lardarius.
60. Dermestes lardarius, larva.
61. Engis fasciata.
61. Ips quadrisignata.

Staphylinidæ.—Rove beetles.

63. Staphylinus chrysurus.
64. Staphylinus cinctus.
65. Staphylinus villosus.
71. And six other species.

Byrrhidæ.—Pill beetles.

72. Byrrhus Americanus.
74. And two other species.

Histeridæ—Mimic beetles.

75. Hister conformis.
76. Hister planus.
78. And two other species.

Lucanidæ.—Stag beetles.

79. Lucanus capreolus.
80. And another species.

Geotrupidæ.—Burrowing beetles.

81. Geotrupes splendens.
82. Geotrupes microphagus.

Scarabeidæ.—Ball rolling beetles.

83. Coprobius lævis.
84. Coprobius ———.
85. Copris anaglypticus.
86. Onthophagus Hecate.

Aphodiidæ.—Footless beetles.

87. Aphodius aterrima.
88. Aphodius terminalis.
90. And two other species.

INSECTS INJURIOUS TO VEGETATION IN A GREATER OR LESS DEGREE.

Rutilidæ.—Shining Beetles.

91. Areoda lanigera, (woolly Areoda.) Male.
92. Areoda lanigera, (woolly Areoda.) Female.
93. Pelidnota punctata, (dotted Pelidnota.) Male.
94. Pelidnota punctata, (dotted Pelidnota.) Female.

Melolonthidæ.—Dor beetle

95. Phyllophaga quercina.—"Dor bug," and larva.
96. Melolontha variolosa.
97. Phyllophaga fraterna.
98. Phyllophaga pilosicollis.
99. Phyllophaga hirticula.
100. Omaloplia sericea.
101. Omaloplia vespertina.
102. Omaloplia nigricornis?
103. Anomala cœlebs.
104. Anomala arboricola.
105. Dichelonycha elongata.
106. Macrodactyla subspinosa.

Cetoniidæ.—Flower beetles.

107. Osmoderma scaber. Male.
108. Osmoderma scaber. Female.
109. Cetonia Inda.
110. Cetonia fulgida.
111. Trichius lunulatus?

Buprestidæ.—Burn-cow beetles.

112. Buprestis Virginica.
113. Buprestis divaricata.
114. Buprestis longipes.
115. Buprestis fasciata.
116. Buprestis striata.
117. Buprestis dentipes.
118. Buprestis fulvoguttata.
119. Buprestis femorata.
122. And three other species.

Elateridæ.—Spring beetles.

123. Elater oculatus.
124. Elater myops.
125. Elater apressifrons.
126. Elater cinereus.
127. Elater communis, larva and pupa. (Wire-worm.)
128. Elater obesus.
142. And fourteen other species.

Lampyridæ.—Glow-worm beetles.

143. Lampyris versicolor. — (Large fire-fly.)
144. Lampyris versicolor. Female. (Fire-fly.)
145. Lampyris scintillans, (common fire-fly.)
146. Lampyris scintillans. Female. Common fire-fly.
147. Lampyris corusca.
148. Lampyris laticornis.
149. Lampyris nigricans.
152. And three other species.
153. Lycus reticulatus.
154. Lycus terminalis.
155. Lycus sanguinipennis.

Telephoridæ.—Net carrying beetles.

156. Telephorus rotundicollis.
157. Telephorus bilineatus.
158. Telephorus laticornis.
173. And fifteen other species.

Cleridæ.—Beehive beetles.

174. Clerus apiarius.
175. Thanasimus dubius.
176. Necrobia ruficollis.
177. Necrobia violacea.

178. Necrobia rufipes.
179. And another species.

Pyrochroidæ.—Flame beetles.

180. Pyrochroa flabellata.

Mordellidæ.—Small flower beetles.

181. Mordella pruinosa.

Cantharidæ.—Blistering beetles.

182. Cantharis cinerea.
183. Cantharis atrata.
184. Meloe angusticollis, (narrow necked oil beetle.)

Helopidæ.

185. Helops vittatus.

Tenebrionidæ.—Darkling beetles.

186. Tenebrio molitor, (meal worm.)
187. Upis Pennsylvanicus.
188. Upis reticulatus.
189. Upis rufipes.
190. And another species.

Bruchidæ.—Devouring weevils.

191. Bruchus pisi, (pea weevil.)

Attelabidæ.—Leaf-rolling Weevils.

192. Attelabus bipustulatus.
193. Attelabus pubescens.
194. Attelabus analis.
195. Apion Sayii.
198. And three other species.

Curculionidæ.—Snout beetles.

199. Balaninus nucum.–Nut weevil.
200. Rhynchænus strobi, (pine weevil.
201. Rhynchænus nenuphar, (curculio, or plum weevil.)
202. Sitophilus oryzæ, (rice weevil.)
203. Sitophilus granaria, (corn weevil.)
209. And six other species.

Scolytidæ.—Cylindrical bark beetles.

210. Hylurgus terebrans.
211. Scolytus pyri.
212. Tomicus pyri.
213. And another species.

Prionidæ.—Saw-horned beetles.

214. Prionus laticollis. Male.
215. Prionus laticollis. Female.
216. Prionus unicolor.
217. Parandra brunnea.
218. Parandra lineola ?

Cerambycidæ.—Borers.

219. Lamia titillator.
220. Lamia scutellatus.
221. Lamia pusillus.
222. Saperda vittata, (apple tree borer.) Male.
223. Saperda vittata, (apple tree borer.)' Female.
224. Saperda vittata, (apple tree borer.) Female expanded.
225. Saperda vestita.
226. Saperda tridentata.
227. Tetraopes tetrophthalmia. Male.
228. Tetraopes arator.
229. Tetraopes arator, var.
230. Stenocorus putator, (oak pruner.)
231. Stenocorus —, var., (oak pruner.
232. Callidium bajulus.
234. Callidium bajulus, var.
235. Callidium violaceum, (pine borer.)
236. Callidium violaceum, expanded.
237. Callidium foveicolle.
239. And two other species.
240. Clytus speciosus.
241. Clytus pictus.
242. Clytus colonus.
243. Clytus undulatus.
257. And fourteen other species.

Lepturidæ.—Narrow-tailed beetles.

258. Desmoctrus palliatus.
259. Rhagium lineatum.
260. Rhagium lineatum, var.
261. Purpuricenus humeralis.
262. Leptura vittata.
263. Leptura atrata.
264. Leptura annulata.
265. Leptura cordifera.
266. Leptura rubrica.
270. And four other species.

Crioceridæ.—Oblong leaf beetles.

271. Donacia metallica.
274. And three other species.
275. Crioceris trilineata, (potato slug.)

Cassidadæ.—Helmet beetles.

276. Cassida Argus, and larva.
277. Cassida clavata.
278. Cassida aurichalcea.
279. Cassida vicina.

Galerucidæ.—Cap-beetles.

280. Galeruca vittata. Male. (Cucumber bug.)
281. Galeruca vittata. Female.
282. Haltica cucumeris, (cucumber flea-beetle.)
283. Haltica chalybea.
290. And seven other species.

Chrysomelidæ.—Golden beetles.

291. Chrysomela trimaculata. Male.
292. Chrysomela trimaculata. Female.
293. Chrysomela trimaculata, exp'd'd.
294. Chrysomela scalaris.
302. And eight other species.
303. Eumolpus auratus. Male.
304. Eumolpus auratus. Female.

INSECTS BENEFICIAL TO VEGETATION.

Coccinellidæ.—Lady-birds.

305. Coccinella borealis.
306. Coccinella mali.
308. Coccinella unicolor.
309. Coccinella 10 maculata.
310. Coccinella 9 notata.
311. Coccinella bimaculata.
312. Coccinella geminata.
313. Coccinella 5 signata.
314. Coccinella binoculata.
315. Coccinella binoculata, malformation.
330. And fifteen other species.

II. ORTHOPTERA.

Blattidæ.—Cockroaches.

1. Blatta orientalis, (domestic cockroach.) Female.
2. Blatta nivea, (wood cockroach.) Male.
3. Blatta —, (cockroach.) Male.
4. Blatta —, (cockroach.) Fem.
5. Blatta —, (cockroach.) Male.
6. Blatta —, (cockroach.) Fem.
7. Blatta nivea, (wood cockroach.) Female.
8. Blatta —, (cockroach.) Young.

Mantidæ.—Mantes.

9. Spectrum femoratum, (walking stick.) Male.
10. Spectrum femoratum, (walking stick.) Female.

Achetidæ.—Cricket.

11. Œcanthus nivea, (white climbing cricket.) Female.
12. Œcanthus nivea, (white climbing cricket.) Young.
13. Œcanthus nivea, (white climbing cricket.) Expanded.
14. Œcanthus nivea, (white climbing cricket.) Male.
15. Acheta abbreviata, (short-winged cricket.) Female.
16. Acheta abbreviata, (short-winged cricket.) Male.

Gryllidæ.—Grasshoppers.

17. Phalangopsis maculata, (spotted wingless grasshopper.)
18. Phaneroptera angustifolia, (narrow-winged grasshopper.) Male.
19. Phaneroptera angustifolia, (narrow-winged grasshopper.) Female.
20. Phaneroptera angustifolia, (narrow-winged grasshopper.) Expanded.
21. Conocephalus ensiger, (sharp-nosed grasshopper.) Male.
22. Orchelimum gracile, (graceful meadow grasshopper.) Young.
23. Orchelimum vulgare, (common meadow grasshopper.) Male.

24. Orchelimum vulgare, (common meadow grasshopper.) Fem.

Locustidæ.—Locusts.

25. Acrydium femoratum, (red-legged locust.) Male.
26. Acrydium femoratum, (red-legged locust.) Female.
27. Acrydium flavovittatum, (yellow-striped locust.) Female.
28. Locusta Carolina, (Carolina locust.) Female.
29. Locusta Carolina? (Carolina locust.) Variety.
30. Locusta Carolina, (Carolina locust.)
31. Locusta corallina, (coral-winged locust.) Male.
32. Locusta sulphurea, (yellow-winged locust.) Female.
33. Locusta æqualis, (barren ground locust.) Male.
34. Locusta viridifasciata, (green-striped locust. Female.
35. Chloealtis curtipennis, (short-winged locust.)
36. Undescribed by Harris.
37. Locusta —, (— locust.) Var.
38. Locusta —, (— locust.) Var.
39. Tetrix ornata, (ornamented grouse locust.)
40. Tetrix —, (grouse locust.)

III. HOMOPTERA.

INSECTS INJURIOUS TO VEGETATION.

Cicadidæ.—Harvest-flies.

1. Cicada canicularis, (dog-day harvest fly, or "Locust.") Male.
2. Cicada canicularis, (dog-day harvest fly, or "Locust.") Fem.
3. Cicada canicularis, (dog-day harvest fly, or "Locust.") Young.
4. Cicada, —, undescribed species.
5. Cicada —, undescribed species. Young.

Membracidæ.—Tree hoppers.

6. Entilia emarginata.
7. Smilia auriculata.
8. Smilia vittata.
9. Smilia guttata.
13. And three other species.
14. Cyrtosia fuliginosa.
15. Telamona querci.
16. Telamona turriculata.
17. Telamona cratægi.
18. Telamona ornata.
19. Telamona fagi.
20. Ceresa bubalus.
21. Thelia bimaculata.
22. Thelia latipes.
23. Thelia binotata.
24. Gargara pectoralis.
25. Gargara querci.
45. And twenty other species.

Aphidæ.—Plant lice.

46. Aphis mali.
48. And two other species.

Coccidæ.—Scale insects.

49. Coccus arborum linearis, (apple tree scale insect.)
50. And another species.

IV. HETEROPTERA.

INSECTS NOT INJURIOUS TO VEGETATION.

Notonectidæ.—Boatmen.

1. Notonecta glauca.
2. Notonecta Americana.
3. Notonecta maculata.
4. Notonecta interrupta.
6. And two other species.
7. Corixa alternata.
8. And another species.

Hydrometridæ.—Water measurers.

9. Hydrometra stagnorum.
10. Hydrometra stagnorum. Female.
11. Gerris remigis.
12. Gerris humilis.

Reduviidæ.—Slender-necked bugs.
13. Reduvius raptatorius.
14. Reduvius personatus.
16. And two other species.

INSECTS INJURIOUS TO VEGETATION, ETC.

Coreidæ.—Squash bugs.
17. Coreus tristis, (squash bug.)
20. And three other species.
Cimicidæ.—" Bed bugs."
21. Cimex lectularius, (common bed bug.)
25. And four other species.
Scutelleridæ.
50. Twenty-five species unnamed.

V. APHANIPTERA.

Pulicidæ.—Fleas.
1. Pulex irritans, (common flea.)
2. Pulex vespertilionis ?-(bat flea.)

VI. DIPTERA.

Culicidæ.—Gnats.
1. Culex pipiens, (common mosquito.)
2. Culex pipiens, (com. mosquito.)
Tipulidæ.—" Long legs."
3. Trichocera hiemalis, (winter turnip gnat.)
4. Ptychoptera clavipes.
5. Pedicia gouiphora.
6. Simulium calceatum.
7. Tipula alternata.
33. and sixteen other species.
Tabanidæ.—Breeze flies.
34. Tabanus atratus ? Male.
35. Tabanus atratus ? Female.
Bombyliidæ.—Bee flies.
36. Bombylius æqualis.
37. Bombylius fulvus.
Anthracidæ.
39. Two species.
Asilidæ.—Gad flies.
40. Asilus thoracicus.
41. Asilus tergissus.
46. And five other species.
Œstridæ.—Horse flies, Bots, &c.
47. Œstrus bovis.
52. And five other species.

BENEFICIAL TO VEGETATION.

Syrphidæ.—Syrphians.
53. Syrphus ribesii.
54. Syrphus balteatus.
55. Syrphus Philadelphicus.
63. And eight other species.
Muscidae—House flies, &c.
64. Musca domestica.
65. Musca harpyia.
66. Musca vomitoria.
67. Musca hirticollis.
110. And forty-three other species.
Conopidæ.—Cone-eyed flies.
114. Four species.

VII. HYMENOPTERA.

INSECTS INJURIOUS TO VEGETATION.

Tenthredinidæ.—Saw-flies.
1. Cimbex ulmi, and larva.
12. And eleven other species.
Cynipidæ.—Gall-flies.
15. Three species.
Evaniidæ.
16. Pelecinus polycerator.
19. And three other species.

BENEFICIAL TO VEGETATION, WITH VERY FEW EXCEPTIONS.

Ichneumonidæ.—Ichneumon flies.

20. Pimpla lunator.
21. Ophion mundus.
22. Ophion flavicornis.
24. And two other species.
25. Ichneumon brevicinctus.
50. And twenty-five other species.

Diplolepidæ.

53. Three species.

Chalcididæ.

57. Four species.

Proctotrupidæ.

60. Three species.

Formicidæ.—Ants.

61. Formica pennsylvanica.
64. And three other species.

Mutillidæ.—Stinging Ants.

65. Mutilla ferrugata.
67. And two other species.

Pompiliidæ.

71. Four species.

Sphegidæ.—Sand Wasps.

72. Sphex Pennsylvanica.
73. Sphex cærulea.
74. Sphex ichneumonea.
77. And three other species.

Vespidæ.—Wasps.

78. Vespa fraterna.
79. Vespa fuscata.
80. Vespa maculata.
140. And about sixty other species.

Apidæ.—Bees.

141. Bombus Americanorum.
142. Bombus impatiens.
144. And two other species.
145. Apis mellifica, (honey bee.)

VIII. NEUROPTERA.

INSECTS BENEFICIAL TO VEGETATION.

Libellulidæ.—Dragon flies.

1. Libellula pulchella.
2. Libellula Lydia.
3. Libellula pruinosa.
4. Libellula exusta.
12. And eight other species.
13. Aeshna heros.
14. Aeshna clepsydra.
15. Aeshna obsoleta.
24. And nine other species.
25. Gomphus furcillata.
34. And nine other species.
35. Agrion materna.
36. Agrion opaca.
37. Agrion basalis.
38. Agrion fugitiva.
39. Agrion hastata.
58. And nineteen other species.

Ephemeridæ.—Day flies or May flies.

59. Ephemera bispinosa.
60. Ephemera fuscicostata.
62. And two other species.

Hemerobiidæ.—Lace-winged flies.

63. Hemerobius irroratus.

Panorpidæ.—Scorpion flies.

64. Panorpa communis vel fasciata.

Sialidæ.

65. Corydalis cornutus. Male.
66. Corydalis cornutus. Female.
67. Chauliodes pectinicornis. Male.
68. Chauliodes pectinicornis. Fem.
69. Chauliodes denticornis.
70. Sialis maurus.

Perlidæ—Aphis lions.

71. Chrysopa perla.–Harris. (Common lace-wing.)

IX. TRICHOPTERA.

Pryganeidæ.—Caddis flies.

1. Phryganea semifasciata.
2. Phryganea interrupta.
3. Phryganea radiata.
4. Phryganea sericea.
5. Phryganea stygipes.
6. Phryganea hieroglyphica.
18. And twelve other species.

X. LEPIDOPTERA.

INSECTS INJURIOUS TO VEGETATION.

Rhopalocera.—Butterflies.

Papilionidæ.

1. Papilio Turnus, (yellow swallow tail.)
2. Papilio Asterias, (butterfly of the parsley worm.) Male.
3. Papilio Asterias, female and pupa.
4. Papilio Troilus. Male.
5. Papilio Troilus. Female.
6. Colias Philodice, (common yellow.) Male.
7. Colias Philodice. Female.
8. Colias Philodice. Underside.
9. Pontia oleracea, (white cabbage butterfly.)

Heliconiidæ.

10. Danaus Plexippus. Male.
11. Danaus Plexippus. Female.

Nymphalidæ.

12. Argynnis Idalia. Male.
13. Argynnis Idalia. Female.
14. Argynnis Aphrodite.
15. Argynnis Bellona.
16. And another variety or species.
17. Melitæa Phæton.
18. Melitæa Myrina.
19. Melitæa Pharos. Male.
20. Melitæa Pharos. Female.
21. Satyrus Alope. Male.
22. Satyrus Alope. Female.
23. Satprus Alope. Underside.
24. Satyrus Andromache. Male.
25. Satyrus Andromache. Female.
26. Satyris Eurythris.
27. And another species.
28. Vanessa Antiopa, larva and pupa.
29. Vanessa Atalanta.
30. Vanessa Atalanta. Underside.
31. Vanessa Milberti, and pupa.
32. Vanessa Milberti. Underside.
33. Vanessa interrogationis, and pupa.
34. Vanessa interrogationis. Underside.
35. Vanessa Progne. Male.
36. Vanessa Progne. Female.
37. Vanessa comma.
38. Pyrameis Huntera. Male.
39. Pyrameis Huntera. Female.
40. Pyrameis Cardui.
41. Pyrameis Cardui. Underside.
42. Limenitis Ursula, and pupa.
43. Limenitis Ursula. Underside.
44. Limenitis Arthemis.
45. Limenitis dyssippus.

Lycaenidæ.

46. Lycaena phlaeas.
47. And another species.
48. Polyommatus Argiolus.
49. Polyommatus Epixanthe. Male.
50. Polyommatus Epixanthe. Fem.
51. Polyommatus Alexis ?
53. And two other species.
54. Argus pseudargiolus. Male.
55. Argus pseudargiolus. Female.
56. Argus pseudargiolus. Underside.
57. Argus Comyntas. Male.
58. Argus Comyntas. Female.
59. Thecla Favonius.
60. Thecla hyperici. Female.
61. Thecla sacer. Male.
62. Thecla Augustus. Male.
63. Thecla Augustus. Female.

Hesperiidæ.—Skippers.

64. Hesperia vel Eudamus Tityrus.
65. Hesperia Bathyllus.
66. Hesperia Juvenalis. Male and pupa.
67. Hesperia Juvenalis. Female.
85. And eighteen other species or varieties.

2. HETEROCERA.—MOTHS.

Sphingidæ.—Hawk moths.

1. Smerinthus excæcata.
2. Smerinthus Astylus.
3. Deilephila Chamænerii.
4. Chœrocampa pampinatrix and pupa.
5. Chœrocampa chœrilus.
6. Sphinx quinquemaculata and pupa, (potatoe and tomato worm.)
7. Sphinx cinerea. Male.
8. Sphinx cinerea. Female.
9. Sphinx Kalmiæ.
10. Sphinx gordius.
11. Sphinx Hylæus.
12. Ceratomia quadricornis and larva.
13. And another species.
14. Thyreus Abbottii and larva.
15. Thyreus Nessus.
16. Sesia Pelasgus. Male.
17. Sesia Pelasgus. Female.

Ægeriidæ.

18. Ægeria exitiosa, (peach tree borer,) and pupa.
19. And another species.

Anthroceridæ.

20. Glaucopis pholus.

Hepialidæ.

21. Cossus Robiniæ.
22. Dryocampa imperialis. Female.
23. Dryocampa senatoria.
24. Dryocampa pellucida.

Bombycidæ.

25. Attacus Cecropia. Male and pupa.
26. Attacus Cecropia. Female.
27. Attacus Polyphemus. Male and pupa.
28. Attacus Polyphemus. Female.
29. Attacus Luna, (green swallow tail.) Male and pupa.
30. Attacus Luna, (green swallow tail.) Female.
31. Attacus Prometheus. Male and pupa.
32. Attacus Prometheus. Female.
33. Saturnia Maia. Male and pupa.

43. Saturnia Io. Male and pupa.
35. Saturnia Io. Female.
36. Bombyx Mori, pupa and cocoon, (silkworm.)
37. Gastropacha Americana, and pupa.
38. Clisiocampa Americana. Male and pupa, (apple tree caterpillar,)
39. Clisiocampa Americana. Female and eggs.
40. Clisiocampa sylvatica. Male and pupa.
41. Clisiocampa sylvatica. Female.
42. Clisiocampa pyxidifera.
43. Pygæra ministra.
44. Pygæra albifrons.
45. and another species.
46. Clostera Americana. Male and pupa.
47. Clostera Americana. Female.
48. Limacodes cippus, and larva.
49. Limacodes pithecium, and pupa.
52. Notodonta, three species.
53. Dicranura borealis.
55. and another species. Male and female.

Arctiidæ.

56. Arctia virgo.
57. Arctia Arge.
58. Arctia phalerata.
59. Arctia virginica, (woolly bear.)
60. Arctia virginica. Female.
61. Arctia Acrea, (salt marsh caterpillar.) Male.
62. Arctia Acrea. Female.
63. Arctia Isabella.
64. Arctia Americana.
65. Arctia textor.
66. Callimorpha militaris.
67. Lophocampha tessellaris.
68. Lophocampa, Caryæ and larva.
69. Orgyia leucostigma. Male and larva.
70. Orgyia leucostigma. Female and pupa.

71. Orgyia antiqua. Male and larva.
72. Orgyia antiqua. Female and pupa.
73. And another species.
74. Euchætes Egle. Male.
75. Euchætes Egle. Female.
79. And four other species.

Lithosiidæ.

80. Gnophria vittata.
82. And two other species.

Noctuidæ.

83. Plusia Gamma. Male.
84. Plusia Gamma. Female.
85. Plusia chrysitis ?
87. And two other species.
88. Cucullia umbratica.
90. And two other species.
91. Mamestra persicariæ.
92. Mamestra albicolon.
93. Mamestra nigricans.
95. And two other species.
96. Polia herbida.
97. And another species.
98. Catocala nupta, (red underwing.)
99. Catocala Epione, (black underwing.)
100. Catocala Amasia.
109. And nine other species.
110. Brepha notha.
111. Scoliopteryx libatrix.
112. Hadena amica.
113. And another species.
114. Agrotis devastator, (cut worm.)
115. Agrotis subgothica, (gothic dart.)
116. Agrotis nigricans.
117. Agrotis nebulosa.
118. Agrotis suffusa.
119. Agrotis segetum.
128. And nine other species.
129. Chareas nigra.
134. And five other species.
135. Cerapteryx graminis.
136. Phlogophora meticulosa, (Angle shades.)
137. Phlogophora meticulosa, var.
138. Xylophasia lithoxylea.
139. Hama testacea, (lesser floured rustic,) and pupa.
140. Euplexia lucipara, (small angle shades.)
141. Apamea nictitans. Male.
142. Apamea nictitans. Female.
143. Graphiphora plecta.
144. And another species.
145. Cloantha perspicillaris.
146. Amphipyra pyramidea.
147. Another species.
200. And about fifty-three other species.

Geometridæ.

201. Anisopteryx vernata, (canker-worm.) Male.
202. Anisopteryx vernata. Female.
203. Anisopteryx pometaria, (orchard canker.) Male.
204. Anisopteryx pometaria. Female.
205. Hyberna Tiliaria, (lime tree winter moth.)
206. Campaea Margaritaria.
207. Biston Betularias, (peppered moth.) Male.
208. Biston Betularias. Female.
209. Eucosmia undulata.
210. Ephyra omicronaria.
210. Eupithecia simpliciata.
211. Geometra serrata.
212. Macaria notata.
213. Drepana unguicula.
214. Aspilates citaria.
215. Epione vespertaria.
216. Bradypetes amataria.
217. Melanippe pustulata.
218. Venilia trinocularis.
219. Platypteryx, one species.
220. Hypena crassalis.
225. And five other species.
226. Margaritia verticalis.
227. Margaritia sticticalis.
228. Margaritia lanceatis.
229. Margaritia centrostrigalis.
237. And eight other species.
239. Galleria, two species.
240. Harpalyce, one species.
249. Cidaria, nine species.
299. And fifty other species.

Pyralidæ.

300, Aglossa dilucidalis.
301. Aglossa pinguinalis.
302. Pyralis farinalis.
325. And twenty-three other species.

Tortricidæ.

326. Carpocapsa pomonella, (codling moth.)
327. Loxotænia rosaceanæ.
328. Loxotænia nebulans.
329. Loxotænia grossulariatæ.
330. Loxotænia roborana.
350. And twenty-six other species.

Tineidæ.

357. Crambus nivalis.
358. Crambus humuli.
359. Tinea tapetzella, (clothes moth.)
360. Ilithea carnea.
361. Chilo forficellus.
362. Yponomeuta pusiella.
363. Eudoria Portlandica.
364. Crambus hamellus.
379. And fifteen other species.
381. Alucita, two species.
385. Pterophorus, four species.
435. And about fifty undescribed species.

Araneides.—Spiders.

25. Twenty-five species.

Thysanura.—Springtails, &c.

1. Lepisma saccharina and larva.
2. Podura plumbea?

Myriapoda.—Centipedes.

1. Julus terrestris.
5. And four more species.
6. Scolopendra morsitans, South America, (in alcohol,) from William H. Floyd.

CATALOGUE OF ANIMALS

In the State Cabinet of Massachusetts, under the direction of the Secretary of the Massachusetts Board of Agriculture. Arranged according to the nomenclature and classification adopted by the Smithsonian Institution, by J. W. P. Jenks, *Zoologist to the Board of Agriculture. Jan.* 1, 1859.

ORDER CHEIROPTERA.

Family Vespertilionidæ.

Genus Vespertilio.

1. *Vespertilio pruinosus*, Say. Hoary Bat. Specimen donated by E. W. Gardner. Preparation donated by J. W. P. Jenks.
2. *Vespertilio noveboracensis*, Linn. Common Bat. Variety. Prepared and donated by Francis E. Everett.
3. *Vespertilio noveboracensis*, Linn. Common Bat. Prepared and donated by J. W. P. Jenks.

ORDER RAPACIA.

Family Talpidæ.

Genus Scalops. Cuv.

4. *Scalops aquaticus*, Cuv. Common Mole. Donated by Frederick Keith. Preparation donated by J. W. P. Jenks.

Genus Condylura. Ill.

5. *Condylura cristata*, Ill. Star-Nosed Mole. Prepared and donated by J. W. P. Jenks.

Family Mustelidæ.

Genus Putorius. Cuv.

6. *Putorius cicognanii.* Small Brown Weasel. Summer dress. Prepared and donated by J. W. P. Jenks.
7. *Putorius cicognanii.* Small Brown Weasel. Change. Prepared and donated by John W. P. Jenks.
8. *Putorius cicognanii.* Small Brown Weasel. Winter dress. Prepared and donated by J. W. P. Jenks.
9. *Putorius richardsonii.* Little Ermine. Prepared and donated by J. W. P. Jenks.
10. *Putorius noveboracensis.* Ermine. Change. Donated by Sumner Colburn. Preparation donated by Charles L. Flint.

11. Red and White Weasel. Donated by J. G. Sargent.
12. *Putorius bison.* Mink. Donated by ———.

FAMILY URSIDÆ.

Genus Procyon. Storr.

13. *Procyon lotor*, Storr. Raccoon. Male. Prepared and donated by J. W. P. Jenks.

ORDER RODENTIA.

FAMILY SCIURIDÆ.

Genus Sciurus. Linn.

14. *Sciurus carolinensis*, Cm. Gray Squirrel. Prepared and donated by J. W. P. Jenks.
15. *Sciurus hudsonius*, Pallas. Red Squirrel. Chickaree. Prepared and donated by J. W. P. Jenks.

Genus Pteromys.

16. *Pteromys volucella*, Cuv. (?) Flying Squirrel. Prepared and donated by J. W. P. Jenks.
17. *Pteromys volucella*, Cuv. (?) Flying Squirrel. Prepared and donated by C. D. Lincoln.

Genus Tamias. Illiger.

18. *Tamias striatus.* Chipmunk. Prepared and donated by J. W. P. Jenks.

Genus Arctomys. Schreber.

19. *Arctomys monax*, Gmelin. Woodchuck. Prepared and donated by J. W. P. Jenks.

FAMILY MURIDÆ.

Genus Jaculus.

20. *Jaculus hudsonius.* Jumping Mouse. Prepared and donated by J. W. P. Jenks.

Genus Fiber. Cuv.

21. *Fiber zibethicus*, Cuv. Musk Rat. Male. Prepared and donated by J. W. P. Jenks.

FAMILY LEPORIDÆ.

Genus Lepus.

22. *Lepus americanus*, Erxl. Hare. Winter dress. Donated by J. A. Leonard, Jr. Prepared by J. W. P. Jenks.

CATALOGUE OF FISHES

Of Massachusetts, mostly fresh water, presented by the Smithsonian Institution, to the Agricultural Department of the State of Massachusetts.

1.	Perca flavescens. Cuv. and Val.	Framingham, . .	1
2.	Perca flavescens.	Brimfield, . . .	2
3.	Pomotis vulgaris. Cuv. and Val.	Brimfield, . . .	1
4.	Pomotis vulgaris. Cuv. and Val.	Framingham, . .	1
5.	Pomotis appendix. DeKay.	Framingham, . .	2
6.	Pomotis vulgaris. Cuv. and Val.	Hingham. . . .	1
7.	Pomotis obesus. Grd.	Holliston, . . .	1
8.	Pomotis obesus. Grd.	Framingham, . .	3
9.	Pomotis obesus. Grd.	Hingham, . . .	1
10.	Osmerus viridescens. Lesu.	Boston Harbor, . .	1
11.	Gunellus mucronatus. DeKay.	Boston Harbor, . .	1
12.	Ammodytes americanus. DeKay.	Boston Harbor, . .	1
13.	Syngnathus peckianus. Storer.	Boston Harbor, . .	1
14.	Anguilla bostoniensis. Lesu.	Framingham, . .	1
15.	Pimelodus atrarius. DeKay.	Brimfield, . . .	1
16.	Gasterosteus noveboracensis. Cuv. and Val.	Cape Cod, . . .	1
17.	Gasteroteus dekayi. Agass.	Hingham, . . .	3
18.	Atherinopsis menidia. Grd.	Hingham, . . .	2
19.	Boleosoma fusiforme. Grd.	Framingham, . .	2
20.	Esox reticulatus. Lesu.	Brimfield, . . .	1
21.	Esox ornatus. Grd.	Framingham, . .	1
22.	Esox reticulatus. Lesu.	Framingham, . .	1
23.	Catostomus bostoniensis. Lesu.	Nichols' Brook, . .	3
24.	Moxostoma gibbosum. Rafin.	Hingham, . . .	3
25.	Luxilus americanus. Grd.	Framingham, . .	1
26.	Luxilus americanus.	Milford Mill, . .	1
27.	Leucosomus pulchellus. Grd.	Framingham, . .	3
28.	Moxostoma gibbosum. Lesu.	Framingham, . .	1
29.	Luxilus americanus. Grd.	Brimfield, . . .	1
30.	Luxilus americanus.	Hingham, . . .	1
31.	Anguilla bostoniensis. Lesu.	Hingham, . . .	1
32.	Leucosomus pulchellus. Grd.	Thames River waters,	1
33.	Leucosomus pulchellus.	Lancaster, Mass., .	1
34.	Leucosomus pulchellus.	Framingham, . .	2
35.	Hydrargyra flavula. Storer.	Hingham, . . .	3
	22 Species.	Specimens, . .	51

INVENTORY

Of Stock, Crops, Tools, &c., at the State Farm at Westborough, Dec. 1, 1857.

8	Oxen,	$745 00
17	Cows, $40,	680 00
1	Hereford Cow,	200 00
1	Jersey Cow,	150 00
1	Devon Cow,	100 00
1	Hereford Heifer,	175 00
1	Hereford Bull,	300 00
1	Hereford Calf,	50 00
1	Jersey Bull Calf,	50 00
1	Jersey Heifer,	50 00
1	Devon Heifer,	50 00
1	Devon Calf,	30 00
1	Grade Jersey Calf,	25 00
1	Grade Devon Calf,	25 00
5	Horses,	680 00
12	Fat Hogs,	240 00
45	Shotes,	360 00
16	Sucking Pigs,	32 00
5	Breeding Sows,	75 00
1	Suffolk Boar,	25 00
80	tons English Hay,	1,200 00
8	tons Rowen,	120 00
25	tons of Meadow Hay,	175 00
2	tons Millet,	30 00
5	tons Straw,	35 00
30	tons Corn Stover,	210 00
1000	bushels shelled Indian Corn,	1,000 00
1561	bushels Ruta-Bagas,	260 00
1800	bushels Carrots,	450 00
50	bushels Seed Potatoes,	38 00
100	bushels small Potatoes,	40 00
25	bushels Oats,	12 00
25	bushels Buckwheat,	19 00
185	bushels Beets,	46 00
124	bushels Parsnips,	41 00
4	Hay Cutters,	40 00
1	Feed Trough,	4 00
12	Hay Forks,	4 00
48	Hay Rakes,	8 00
24	Manure Forks,	30 00
80	Shovels,	48 00
26	Spades,	20 00
40	Picks,	40 00
2	Manure Hooks,	1 00
15	Iron Bars,	15 00
3	Stone Hammers,	5 00
1	Ox Wagon,	35 00
1	Two-Horse Wagon,	20 00
1	One-Horse Wagon,	30 00
3	Ox Carts,	60 00
4	Horse Carts,	160 00
4	Stone Drags,	7 00
10	Ploughs,	100 00
4	Harrows,	24 00
1	Cultivator,	3 00
2	Horse Hoes,	12 00
2	Hand Cultivators,	2 00
2	Horse Harrows,	4 00
2	Job Wagons,	90 00

5	Ox Yokes,	$8 00
10	Draft Chains,	12 00
1	Derrick Chain,	7 00
6	Stake Chains,	4 00
2	Ox Sleds,	8 00
1	Horse Sled,	5 00
1	Two-Horse, Double-runner Sled,	12 00
1	Pleasure Sleigh,	15 00
1	lot of Old Harness,	35 00
1	New Harness,	18 00
1	Horse-cart Harness,	9 00
6	Trace Chains,	4 00
	Stable Furniture,	10 00
	Furniture in Scale Room,	5 00
1	Iron Roller,	20 00
1	Fanning Mill and Corn Sheller,	12 00
1	Stone Elevator,	165 00
8	bushels Seed Corn,	10 00
5	bushels Seed Beans,	12 50
1	bushel Seed Pease,	2 50
2	bushels Millet Seed,	4 00
1	Seed Sower,	3 00
1	set Steel-yards,	2 00
1	Platform Scale,	7 00
20	Strawbery Boxes,	1 00
48	Hand Hoes,	16 00
10	Hand Drills,	6 00
2	Hand Hammers,	3 00
12	Wheelbarrows,	20 00
1	Beetle, with Wedges,	2 00
2	Grindstone,	10 00
4	Water Cans,	2 00
6	Bog Hoes,	2 00
4	Axes,	3 00
6	Wood Saws,	6 00
4	Ice Hooks,	1 00
1	pair Ice Tongs,	2 00
2	Cross-cut Saws,	6 00
	Carpenters' Tools,	20 00
4	Scythes and Snaths,	2 00
20	Baskets,	7 00
12	Milk Cans,	6 00
1	lot first quality of Lumber,	25 00
1000	feet Pine Lumber,	16 00
4	Water Buckets,	1 00
1	Surveyor's Chain,	2 00
1	Ox Shovel,	6 00
1	Spirit Level,	2 00
1	Swill Cart,	40 00
1	Refrigerator,	10 00
2	Derricks,	75 00
	Household Furniture,	156 00
1	Garden Rule,	1 00
24	Corn Cutters,	4 00
1	Root Cutter,	10 00
1	Saddle,	5 00
8	Iron-toothed Rakes,	3 00
3	Wheel Hoes,	3 00
		$9,344 00

INVENTORY

Of Personal Property on the State Farm, Westborough, Dec. 1, 1858.

6 Oxen,		$530 00
17 Cows,		850 00
2 Hereford Cows,		300 00
1 Hereford Bull,		200 00
1 Hereford two yearling Heifer,		100 00
1 Hereford Bull Calf,		75 00
1 Jersey Cow, (diseased in udder,)		40 00
1 Jersey Heifer,		100 00
1 Devon Cow,		100 00
1 Devon Heifer two years old,		50 00
1 Devon Heifer one year old,		30 00
1 Devon Heifer Calf,		20 00
1 Durham Cow,		200 00
1 Durham Bull Calf,		100 00
1 Durham Heifer Calf,		50 00
1 Grade Devon Heifer,		25 00
1 Grade Jersey Heifer,		25 00
1 Grade Ayrshire Calf,		20 00
1 Ayrshire Bull,		75 00
5 Horses,		500 00
2 Fat Hogs,	$30 00	
4 Breeding Sows,	60 00	
1 Boar,	25 00	
52 Shotes,	300 00	
14 Sucking Pigs,	25 00—	440 00
81 tons English Hay,		1,215 00
4 tons Rowen,		60 00
36 tons Meadow Hay,		250 00
2 tons Millet,		24 00
6 tons Straw Hay,		48 00
15 tons Corn Stover,		120 00
536 bushels Shelled Indian Corn,		536 00
590 bushels Ruta-Bagas,		118 00
1520 bushels Turnips,		304 00
1076 bushels Carrots,		269 00
117 bushels Seed Potatoes,		58 50
50 bushels Oats,		27 50
2 bushels Buckwheat,		1 50
30 bushels Wheat,		45 00
8 bushels Barley,		8 00
3 bushels Rye,		3 00
670 bushels Beets,		167 50
400 bushels Parsnips, by estimation,		100 00
4 Hay Cutters,		40 00
1 Feed Trough,		4 00
10 Hay Forks,		4 00
30 Hay Rakes,		5 00
26 Manure Forks,		32 50
100 Shovels,		50 00
22 Spades,		18 00
Amount carried up,		$7,338 50

Amount brought up,	$7,338 50
61 Picks,	61 00
2 Manure Hooks,	1 00
15 Iron Bars,	15 00
3 Stone Hammers,	5 00
1 Ox Wagon,	35 00
1 Two-Horse Wagon,	20 00
1 One-Horse Wagon,	15 00
1 Lumber Wagon,	50 00
1 Job Wagon,	60 00
3 Ox Carts,	60 00
4 Horse Carts,	140 00
3 Stone Drags,	6 00
10 Ploughs,	90 00
4 Harrows,	20 00
1 Cultivator,	3 00
2 Horse Hoes,	12 00
2 Hand Cultivators,	2 00
2 Horse Harrows,	4 00
5 Ox Yokes,	12 00
9 Draft Chains,	12 00
2 Derrick Chains,	10 00
6 Stake Chains,	4 00
1 Ox Sled,	4 00
1 Horse Sled,	5 00
1 Two-Horse Double-runner Sled,	10 00
1 Pleasure Sleigh,	10 00
1 lot of old Harnesses,	40 00
1 Harness,	10 00
4 Horse-Cart Harnesses,	32 00
4 Trace Chains,	3 00
Stable Furniture,	10 00
Furniture in Scale Room,	5 00
1 Iron Roller,	20 00
Fanning Mill and Corn Sheller,	12 00
1 Stone Elevator,	165 00
2 bushels Seed Corn,	4 00
1 bushel Seed Beans,	2 00
1 Seed Sower,	3 00
1 Platform Scale,	7 00
20 Strawberry Boxes,	1 00
60 Hand Hoes,	20 00
10 Hand Drills,	6 00
2 Hand Hammers,	3 00
20 Wheelbarrows,	40 00
1 Beetle, with Wedges,	2 00
2 Grindstones,	10 00
4 Water Cans,	2 00
6 Bog Hoes,	5 00
8 Axes,	5 00
Amount carried forward,	$8,411 50

	Amount brought forward,	$8.411 50
6	Wood Saws,	5 00
6	Ice Hooks,	2 00
1	pair Ice Tongs,	2 00
2	Cross-cut Saws,	6 00
	Carpenters' Tools,	18 00
6	Scythes and Snaths,	3 00
20	Baskets,	6 00
18	Milk Cans,	10 00
500	feet Pine Lumber,	7 00
4	Buckets,	1 00
3	Milk Pails,	60
1	Surveyor's Chain,	2 00
1	Ox Shovel,	6 00
1	Spirit Level,	2 00
1	Swill Cart,	40 00
1	Refrigerator,	10 00
2	Derricks,	75 00
	Household Furniture,	100 00
1	Garden Rule,	75
15	Corn Cutters,	2 00
	Amount carried up,	$8,709 85

	Amount brought up,	$8,709 85
1	Root Cutter,	10 00
1	Saddle,	4 00
8	Iron-Toothed Rakes,	3 00
3	Wheel Hoes,	3 00
1	Wheel Stone Drag,	8 00
6	Stone Boat Plank,	5 00
	Plank for six Sled Runners,	6 00
	Furniture in Blacksmith's Shop,	30 00
	Gate Hangings,	5 00
20	Weeding Trowels,	1 20
1	Corn Fork,	1 50
	Carboy Sulphuric Acid,	6 51
1	Pruning Saw and Chisel,	1 00
8	Corn Bags,	1 00
4	Sack Bags,	50
15	Acres of Winter Rye on the Ground,	75 00
		$8,870 56
	Cash on hand December 1, 1858,	373 48
	Total,	$9,244 04

ACCOUNT OF THE TREASURER OF THE STATE FAIR, 1857.

Dr. MASS. STATE BOARD OF AGRICULTURE *in account with* WILLIAM G. LEWIS, TREASURER. *Cr.*

1858. Dec. 24,	To net amount of premiums paid,	$4,086 00	1857. Oct. 13,	By cash received of State Society,		$2,000 00
	of expenses paid,	7,485 32	24,	for sale of tickets at the Fair Grounds,	$4,158 75	
				Less discount for uncurrent and counterfeit bills,	7 75	4,151 00
				By cash for peddlers' licenses,		13 00
				for entry fees,		852 00
				By Donations of Premiums presented the Board by— Q. A. Shaw,	$60 00	
				Nourse, Mason & Co.,	79 00	
				Blake, Barnard & Co.,	54 00	
				E. W. Bull,	20 00	213 00
			Nov. 23,	By sale of old Lumber, &c., &c.,		282 32
			Dec. 5,	cash of M. P. Wilder, Esq.,	$1,791 88	
			30,	cash of M. P. Wilder, Esq.,	500 00	
			1858. Jan. 25,	cash of M. P. Wilder, Esq.,	800 00	
			April 6,	cash of M. P. Wilder, Esq.,	968 12	4,060 00
		$11,571 32				$11,571 32

BOSTON, Jan. 19, 1859.

WM. G. LEWIS, *Treasurer.*

State Board of Agriculture *in account with the* Commonwealth of Massachusetts.

	Dr.	Cr.
Cash on hand December 1, 1857,	$357 15	
Inventory of personal estate December 1, 1857,	9,364 00	
Cash paid, for boys' labor,	. .	$1,582 20
mens' labor, superintending boys,	. .	417 80
Reform School, for swill,	. .	350 00
improvement laying wall, setting trees,	. .	650 00
stock,	. .	887 25
Cash on hand belonging to State appropriation,	. .	112 75
appropriated by State,	4,000 00	
received of Reform School,	1,574 15	
Sundries received of Reform School,	49 34	
Cash paid, produce of farm furnished Reform School,	. .	1,623 49
improvements,	. .	681 12
labor, men, oxen and boys, on improvements,	681 12	
seeds,	. .	185 18
stationery,	. .	8 45
farm account,	. .	473 48
service as treasurer,	. .	100 00
farm produce,	1,155 02	
repairs,	. .	357 69
grain and milling,	. .	185 66
lactometer,	. .	15 00
farm implements,	. .	87 10
mens' labor,	. .	1,794 35
contingent expenses,	. .	167 72
Davis & Bullard, expenses of Board of Agriculture,	. .	61 74
pasturing,	. .	106 36
board of men,	. .	675 71
farm produce, labor, and teaming,	2,843 66	
fertilizers,	. .	355 30
inventory of personal estate Dec. 1, 1858,	. .	8,885 36
Cash on hand December 1, 1858,	. .	260 73
	$20,024 44	$20,024 44

I have examined the foregoing account, including the cash account of the Treasurer, and find the same to be correctly cast, and properly vouched.

JOHN BROOKS.

Boston, January 19, 1859.

RETURNS OF AGRICULTURAL SOCIETIES FOR 1858.

FINANCES.

SOCIETIES.	Amount received from the Commonwealth.	Income of the permanent fund.	New members & donations.	All other sources.	Receipts for the year.	Premiums offered.	Premiums and gratuities paid out.	Current expenses of the year.	Disbursements for the year.	Indebtedness.	Value of real estate.	Value of personal property.	Permanent fund, (par value.)
Massachusetts, . .	$600 00	$1,933 00	$9,166 87	$250 83	$11,950 70	$1,600 00	$650 00	$3,728 82	$4,378 82	-	-	-	$34,266 87
Essex, ...	600 00	555 98	111 00	473 82	1,740 80	2,288 00	1,272 47	866 24	2,138 71	-	$6,000 00	$1,725 00	9,806 12
Middlesex, ...	600 00	128 00	72 00	646 50	1,446 50	788 00	708 30	856 09	1,564 39	-	3,200 00	1,850 00	5,050 00
Middlesex South, .	600 00	25 30	198 00	659 08	1,482 08	1,161 00	543 81	857 67	1,401 48	$3,400 00	7,350 00	900 00	8,250 00
Middlesex North, .	600 00	15 00	123 00	1,168 64	1,906 64	955 00	726 12	674 90	2,443 64	267 47	2,921 29	2,400 00	5,321 29
Worcester, ...	600 00	352 00	120 00	1,265 71	2,337 71	1,148 00	-	1,157 74	1,157 74	15,960 00	20,000 00	6,000 00	4,400 00
Worcester West, . .	600 00	140 00	12 00	128 00	880 00	720 00	474 11	173 95	648 06	-	-	3,211 58	3,211 58
Worcester North, .	600 00	190 93	185 00	277 64	1,253 57	857 25	701 96	266 83	968 79	-	-	3,800 00	3,800 00
Worcester South, .	364 40	94 02	35 00	31 00	524 42	475 00	302 75	91 64	394 39	-	-	2,000 00	2,000 00
Hampshire, Franklin and Hampden,	600 00	240 00	74 00	425 93	1,339 93	1,011 25	671 72	671 33	1,347 05	-	4,200 00	100 00	4,000 00
Hampshire, . . .	600 00	175 43	12 50	159 79	947 72	590 79	203 70	505 99	709 68	235 79	500 00	359 24	3,050 00
Hampden, ...	600 00	1,107 02	1,457 45	10,859 01	14,023 48	4,273 00	3,624 07	8,362 95	13,465 52	12,809 03	31,634 28	1,000 00	19,825 25
Hampden East, . .	444 00	133 20	36 48	294 85	908 53	637 00	518 60	136 94	655 54	50 00	-	2,950 00	2,825 00
Franklin, ...	600 00	207 34	37 50	530 14	1,374 94	699 50	600 80	739 03	1,339 33	-	-	150 00	3,500 00

Berkshire, ...	600 00	130 00	172 00	2,123 45	2,895 45	1.205 00	1,162 00	745 19	1,907 15	630 00	8,500 00	100 00	8,000 00
Housatonic, . . .	600 00	450 50	51 00	1,302 07	2,403 57	1,018 00	879 00	599 25	1,478 25	6,196 99	8,000 00	50 00	8,666 00
Norfolk, ...	600 00	-	480 00	2,204 14	3,284 14	1,944 75	653 50	1,728 84	4,367 78	4,800 00	10,414 00	-	10,414 00
Bristol, ...	600 00	277 81	279 00	884 61	2,041 45	1,380 00	933 37	702 76	1,636 13	-	-	4,740 00	4,740 00
Plymouth, ...	600 00	468 94	205 00	4,172 83	5 446 77	1,532 00	954 24	1,023 50	4,529 89	3,940 47	17,000 00	700 00	17,700 00
Barnstable, . . .	600 00	56 40	50 00	1,040 28	1,746 68	622 00	496 38	1,172 73	1,569 11	1,200 00	5,000 00	1,190 00	6,190 00
Nantucket, . . .	200 00	78 30	23 00	272 48	573 78	321 00	157 00	213 39	370 39	-	-	1,233 39	1,030 00
Totals, . . .	$11,808 40	$6,759 20	$12,898 80	$29,170 80	$60,508 86	$25,296 54	$16,233 40	$25,275 78	$48,471 84	$49,489 75	$124,719 57	$34,459 21	$176,046 11

PERMANENT FUND—HOW INVESTED.

MASSACHUSETTS.—Stock in Boston banks and Massachusetts Life Office.

ESSEX.—Bank stock, bonds, and notes.

MIDDLESEX.—Real estate, bank, railroad stock and mortgages.

MIDDLESEX SOUTH.—Real estate, $7,350; pens, &c., $300; notes receivable on interest, $600.

MIDDLESEX NORTH.—Real estate and note.

WORCESTER.—Bank stock.

WORCESTER WEST.—Promissory notes and cattle pens.

WORCESTER NORTH.—Bank stock, notes of hands, cattle pens, &c.

WORCESTER SOUTH.—Loaned on collateral security to double the amount of the fund, except $255 in pens, tables, storehouse and fixtures.

HAMPSHIRE, FRANKLIN AND HAMPDEN.—Notes secured by mortgage on real estate and personal securities.

HAMPSHIRE.—Loans on real estate mortgages, $2,550; notes of life members on interest, $218.16.

HAMPDEN.—Land, buildings, furniture, implements, tools and notes.

HAMPDEN EAST.—Notes.

FRANKLIN.—Notes and mortgages.

BERKSHIRE.—Notes and real estate.

HOUSATONIC.—Real estate and notes bearing annual interest, five hundred and fifty-three in number, against as many individuals.

NORFOLK.—Real estate occupied by the Society.

BRISTOL.—Bank Stock.

PLYMOUTH.—Real and personal estate, to wit, 43 acres of land, costing $8,000; buildings thereon, costing $9,000; cattle pens and other appurtenances, $700.

BARNSTABLE.—Notes bearing interest, $890; cattle pens, $300.

NANTUCKET.—Notes (personal) and bull.

ANALYSIS OF PREMIUMS AND GRATUITIES AWARDED.

FOR FARMS, FARM IMPROVEMENTS, MANURES, &c.

SOCIETIES.	For management of farms.	For draining.	For subsoiling.	For ploughing at the Exhibition.	For reclaiming swamp lands.	For experiments with manures.	For spading.	For hedges and ornamental trees.	For reclaiming old pastures.	For orchards of all kinds.	For Cranberries.	Total am't offered for farm improvem'ts.	Am't awarded for farm improvements.	Am't paid out for farm improvements.
Massachusetts,	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Essex,	$30 00	$20 00	-	$98 00	$15 00	-	-	-	-	-	-	$555 00	$240 00	$240 00
Middlesex,	-	10 00	-	61 00	-	-	$10 00	-	-	-	-	89 00	81 00	81 00
Middlesex South,	-	-	-	45 00	-	-	-	-	-	$39 00	-	330 50	84 00	84 00
Middlesex North,	-	-	-	41 00	-	-	-	-	-	-	-	44 00	41 00	41 00
Worcester,	-	-	-	88 00	-	-	-	-	-	-	$1 00	95 00	-	-
Worcester West,	-	-	-	30 00	-	$10 00	-	-	-	-	-	60 00	-	-
Worcester North,	-	13 00	-	56 00	-	-	-	-	-	19 00	-	45 00	32 00	32 00
Worcester South,	-	-	-	29 00	-	-	-	-	-	-	-	-	-	-
Hampshire, Franklin & Hampden,	-	-	-	-	-	-	-	-	-	-	2 00	25 00	-	-
Hampshire,	-	5 00	-	24 00	-	4 00	-	-	$6 00	10 00	-	149 84	49 00	28 00
Hampden,	50 00	-	-	-	-	-	-	-	-	-	-	263 00	50 00	25 00
Hampden East,	-	-	-	18 00	-	-	-	-	-	-	75	76 25	18 75	18 75
Franklin,	-	-	-	-	-	9 00	-	-	-	19 00	3 00	84 00	31 00	31 00
Berkshire,	-	-	-	47 00	10 00	-	-	-	-	15 00	-	75 00	72 00	72 00
Housatonic,	-	-	-	42 00	-	-	-	-	-	-	-	-	-	-
Norfolk,	25 00	-	-	57 00	10 00	-	19 00	-	8 00	15 00	-	534 00	134 00	157 00
Bristol,	-	-	-	68 00	-	-	-	-	20 00	-	15 00	366 00	103 00	103 00
Plymouth,	-	-	-	50 00	-	36 00	7 50	-	-	-	-	-	-	-
Barnstable,	-	-	-	14 00	-	18 00	-	-	10 00	-	4 00	119 00	46 00	46 00
Nantucket,	-	-	-	9 00	-	-	-	-	-	10 00	-	25 00	19 00	19 00
Totals,	$105 00	$48 00	-	$777 00	$35 00	$77 00	$36 50	-	$44 00	$127 00	$25 75	$2,935 59	$1,000 75	$977 75

FOR FARM STOCK.

SOCIETIES.	Bulls.	Milch Cows.	Heifers.	Calves.	Working Oxen.	Steers.	Fat Cattle.	Horses.	Sheep.	Swine.	Poultry.	Other Stock.	Amount offered for live stock.	Am'nt awarded for live stock.
Massachusetts,	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Essex,	$97 68	$43 00	$53 80	-	$28 00	$22 56	$33 36	$151 84	$28 40	$22 00	$21 00	-	$619 00	$501 64
Middlesex,	63 00	46 00	30 00	$9 00	16 00	10 00	18 00	88 00	-	25 00	20 00	-	330 00	325 00
Middlesex South,	30 00	23 00	18 00	12 00	36 00	20 00	16 00	142 00	2 00	46 00	20 25	$46 00	395 00	411 25
Middlesex North,	57 00	21 00	31 00	-	22 00	16 00	57 00	228 00	14 00	27 00	26 00	65 00	359 00	313 00
Worcester,	65 24	46 00	48 76	10 00	49 00	61 00	47 00	285 00	22 00	55 00	40 00	-	733 00	729 00
Worcester West,	29 00	41 00	15 00	14 50	36 00	31 00	43 00	39 00	8 00	22 00	11 00	9 50	369 00	299 00
Worcester North,	31 00	27 00	46 00	35 50	27 00	37 50	39 00	68 00	9 50	31 50	10 00	-	352 50	362 00
Worcester South,	32 00	12 00	21 50	4 50	26 00	21 00	14 00	24 00	14 00	24 00	2 50	-	230 00	195 50
Hampshire, Franklin & Hampden,	27 00	29 00	21 00	16 00	69 00	34 00	58 00	159 00	18 00	27 00	-	115 00	506 00	573 00
Hampshire,	19 00	10 45	10 00	14 00	69 00	20 50	12 00	66 74	8 95	22 18	4 68	8 00	259 25	265 50
Hampden,	52 00	53 00	18 00	9 00	30 00	30 00	46 00	3,314 00	26 00	38 00	4 00	10 00	3,715 50	3,401 00
Hampden East,	25 00	9 00	8 00	3 00	22 00	26 00	24 00	77 00	32 00	21 00	4 00	34 00	355 50	285 00
Franklin,	39 00	33 00	20 00	17 00	27 00	70 00	38 00	85 00	23 00	27 00	6 50	114 00	430 00	499 50
Berkshire,	38 00	76 00	40 00	12 00	45 00	44 00	31 00	235 00	89 00	33 00	21 00	-	684 00	664 00
Housatonic,	21 00	25 00	20 00	6 00	27 00	40 00	18 00	76 00	55 00	21 00	8 00	103 00	436 00	420 00
Norfolk,	14 00	46 00	38 00	6 00	21 00	24 50	-	162 00	10 00	22 00	36 00	-	540 00	379 50
Bristol,	45 00	38 00	14 00	12 00	49 00	45 00	35 00	92 00	17 00	21 00	29 50	-	362 00	397 50
Plymouth,	35 40	-	23 00	30 00	33 00	37 00	58 00	162 00	-	40 00	15 00	-	580 00	608 40
Barnstable,	22 00	8 00	11 00	-	26 00	35 00	34 00	6 00	9 00	25 00	6 50	-	245 00	181 50
Nantucket,	8 00	15 00	9 00	-	4 00	-	-	11 00	-	14 00	6 00	-	117 00	67 00
Totals,	$750 32	$601 45	$496 06	$210 50	$660 00	$625 06	$621 36	$5,370 58	$405 85	$563 68	$291 93	$504 50	$11,617 75	$10,918 29

ANALYSIS OF PREMIUMS AND GRATUITIES AWARDED—Continued.

FOR FARM PRODUCTS.

SOCIETIES.	Indian Corn.	Wheat.	Rye.	Barley.	Oats.	Beans.	Grass Crops.	Grass Seeds.	Potatoes.	Carrots.	Beets.	Parsnips.	English Turnips.	Ruta-Bagas.	Onions.	Other Root Crops.
Essex,	$10 00	-	$10 00	-	-	-	-	-	-	-	$10 00	-	-	$10 00	-	$20 00
Middlesex,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	31 00
Middlesex South,	8 00	$8 00	-	-	-	-	-	-	-	-	.	-	-	-	-	25 00
Middlesex North,	37 00	10 00	-	-	-	-	-	-	-	-	-	-	-	-	-	31 00
Worcester,	3 00	6 00	3 00	$1 00	$1 00	$2 00	-	$1 00	$3 00	$3 00	2 00	-	$2 00	3 00	$2 00	5 00
Worcester West,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Worcester North,	21 90	9 00	5 00	2 00	5 00	1 50	-	3 00	20 79	4 00	3 25	-	5 75	5 00	6 50	2 63
Worcester South,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hampshire, Franklin & Hampden,	-	18 00	18 00	-	-	-	-	2 00	-	2 00	-	-	-	-	-	15 00
Hampshire,	15 00	8 00	1 00	-	-	-	-	-	3 00	2 00	-	-	1 00	-	-	-
Hampden,	5 50	8 00	4 00	-	-	-	-	-	4 00	6 00	4 50	$2 00	-	-	1 50	2 75
Hampden East,	11 00	4 50	1 50	-	50	2 00	-	-	3 50	1 50	4 00	-	1 25	2 00	4 00	-
Franklin,	36 00	10 00	8 00	-	-	-	-	-	6 00	3 00	-	-	2 00	3 00	-	-
Berkshire,	30 00	21 00	21 00	15 00	21 00	6 00	-	3 00	16 00	7 00	6 50	-	4 50	6 00	4 50	29 00
Housatonic,	45 00	31 00	14 00	10 00	21 00	5 00	$5 00	21 00	20 00	14 00	5 00	-	6 00	-	-	6 00
Norfolk,	-	4 00	-	-	-	-	-	-	10 00	-	-	-	-	-	-	9 00
Plymouth,	51 00	8 00	18 00	14 00	14 00	10 00	-	-	-	4 00	-	-	-	8 00	5 00	8 00
Bristol,	33 00	-	8 00	6 00	6 00	10 00	-	-	16 00	-	8 00	-	13 00	-	-	19 12
Barnstable,	18 00	13 00	6 00	4 00	7 00	-	-	-	15 75	-	-	-	9 50	-	1 00	-
Nantucket,	5 00	-	-	-	-	3 00	3 00	-	-	-	-	-	-	-	-	-
Totals,	$329 40	$108 50	$117 50	$52 00	$75 50	$39 50	$8 00	$30 00	$118 04	$46 50	$43 25	$2 00	$45 00	$37 00	$24 50	$202 50

FARM PRODUCTS—Continued.

SOCIETIES.	Sums offered for Grain & Root Crops.	Sums awarded for Grain and Root Crops.	Sums paid out for Grain and Root Crops.	Amount awarded for Broomcorn Brush.	For Fruits.	For Flowers.	For other Cultivated Crops.	For Butter.	For Cheese.	For Honey.	For Wheat Bread.	For Rye Bread.	For Corn Bread.	Sums paid out for Farm Products.
Essex,	$195 00	$60 00	-	-	$135 00	$50 00	$50 00	$57 00	$28 00	$3 00	$9 50	-	-	$392 50
Middlesex,	31 00	31 00	$31 00	-	160 20	-	-	20 00	-	-	14 00	-	-	225 00
Middlesex South,	146 00	41 00	39 32	-	47 30	3 25	-	10 00	2 00	-	3 50	$5 00	$3 00	100 12
Middlesex North,	78 00	78 00	46 75	-	90 00	-	41 00	16 00	-	-	12 00	9 00	-	201 00
Worcester,	57 00	37 00	-	-	-	-	-	18 00	33 00	-	3 00	-	50	-
Worcester West,	46 00	-	-	-	17 00	1 50	2 50	10 00	45 00	-	5 00	-	5 00	86 00
Worcester North,	99 50	69 00	69 00	-	68 25	7 50	17 64	17 50	2 00	2 00	2 50	1 50	1 50	201 09
Worcester South,	-	-	-	-	18 50	-	-	9 00	9 00	-	7 00	-	4 00	47 50
Hampshire, Franklin and Hampden,	120 00	55 00	-	$6 00	32 75	-	-	10 00	8 00	2 00	2 00	2 00	1 50	25 00
Hampshire,	42 83	30 00	4 00	-	15 25	4 08	-	17 88	7 38	5 00	2 13	2 13	2 13	38 50
Hampden,	185 25	62 25	58 25	-	61 50	9 25	-	13 00	14 00	3 00	1 50	1 50	-	193 25
Hampden East,	64 70	35 25	35 25	-	23 25	4 00	23 50	6 00	6 00	3 00	3 00	1 50	1 50	88 55
Franklin,	83 00	68 00	68 00	2 00	16 50	3 00	-	6 50	6 00	-	3 75	2 00	1 75	121 75
Berkshire,	203 50	190 50	190 50	-	19 00	10 00	8 50	21 00	21 00	-	3 00	3 00	-	297 00
Housatonic,	225 00	203 00	203 00	-	29 00	11 00	24 00	21 00	21 00	1 00	4 00	2 00	4 00	323 00
Norfolk,	112 00	23 00	58 00	-	29 00	23 00	-	52 00	-	-	6 00	5 00	5 00	169 00
Plymouth,	257 00	133 00	25 00	-	80 00	-	40 00	39 00	39 00	-	6 00	6 00	-	25 00
Bristol,	229 00	119 12	119 12	-	94 25	8 00	-	20 00	15 00	6 00	7 00	-	7 50	276 87
Barnstable,	111 00	73 25	73 25	-	22 50	10 00	2 50	14 00	7 00	-	6 00	6 00	6 00	147 25
Nantucket,	94 00	18 25	18 25	-	20 50	8 50	-	5 00	-	1 50	1 50	-	-	73 50
Totals,	$2,279 08	$1,326 62	$1,038 69	$8 00	$976 75	$153 58	$201 14	$382 88	$331 38	$26 50	$102 37	$46 63	$42 87	$3,011 88

MISCELLANEOUS.

SOCIETIES.	Amount awarded for agricultural implements.	Amount offered for raising forest trees.	For other agricultural objects.	For mechanical inventions, domestic manufactures, &c.	Number of persons who received premiums and gratuities.
Massachusetts, . .	–	$1,000 00	$650 00	–	5
Essex, . . .	–	30 00	–	$165 00	324
Middlesex, . . .	–	–	10 00	7 00	160
Middlesex South, .	$7 50	85 00	–	84 22	220
Middlesex North, .	10 00	–	541 00	228 12	264
Worcester, . . .	21 00	30 00	–	13 00	129
Worcester West, .	12 25	30 00	–	47 86	152
Worcester North, .	3 00	50 00	–	60 75	212
Worcester South, .	–	50 00	–	28 75	85
Hampshire, Franklin and Hampden, .	30 00	20 00	–	80 25	224
Hampshire, . .	18 75	10 00	17 10	48 97	286
Hampden, . . .	12 00	25 00	–	171 00	273
Hampden East, . .	–	–	–	29 33	107
Franklin, . . .	4 00	10 00	–	78 00	154
Berkshire, . . .	7 00	–	21 00	–	311
Housatonic, . .	7 00	–	13 00	77 00	229
Norfolk, . . .	–	30 00	–	51 50	175
Plymouth, . . .	–	160 00	–	278 50	494
Bristol, . . .	–	105 00	–	156 00	313
Barnstable, . .	8 00	14 00	–	99 63	159
Nantucket, . . .	–	15 00	144 00	13 00	81
Totals, . .	$140 50	$1,664 00	$1,396 10	$1,707 88	4,357

Names of the Towns and Cities in which resided the persons when receiving the Premiums and Gratuities awarded by the County Societies, and the several amounts as disbursed.

ESSEX.

Amesbury,	$10 00	Marblehead,	$26 50
Andover,	25 30	Middleton,	10 46
Beverly,	59 30	Newbury,	60 48
Boxford,	28 00	Newburyport,	57 75
Bradford,	31 40	North Andover,	137 72
Danvers,	183 75	Rockport,	2 00
Essex,	26 88	Rowley,	18 80
Georgetown,	5 80	Salem,	222 42
Gloucester,	5 50	South Danvers,	107 68
Groveland,	15 70	Swampscott,	20 50
Hamilton,	20 98	Topsfield,	55 90
Ipswich,	41 20	Wenham,	11 64
Lawrence,	10 00	West Newbury,	44 00
Lynn,	44 48	Providence, R. I.,	5 00
Lynnfield,	4 00	New York,	5 00
Manchester,	1 00	Total,	$1,299 14

MIDDLESEX.

Acton,	$14 00	Cambridge,	$20 80
Bedford,	4 10	Carlisle,	13 00
Billerica,	1 00	Chelmsford,	9 40
Brighton,	23 10	Concord,	242 00

MIDDLESEX—CONTINUED.

Dracut, ...	$15 40	South Reading, . . .	$10 80
Dunstable, ...	3 00	Stow, ...	23 80
Framingham, . . .	34 40	Sudbury, ...	29 70
Groton, ...	4 30	Tewksbury, ...	4 40
Holliston, ...	6 00	Waltham, ...	2 70
Lexington, ...	14 60	Watertown, ...	7 50
Lincoln, ...	25 60	Wayland, ...	34 00
Littleton, ...	53 00	West Cambridge, . . .	7 70
Lowell, ...	9 30	Westford, ...	10 50
Marlborough, . . .	4 00	Weston, ...	10 00
Pepperell, ...	4 40	Wilmington, . . .	21 30
Shirley, ...	2 00	Woburn, ...	7 50
Somerville, ...	5 00	Total, . . .	$708 30

MIDDLESEX SOUTH.

Ashland, ...	$39 50	Newton, ...	$8 50
Framingham, . . .	293 61	Sherborn, ...	6 50
Holliston, ...	20 25	Southborough, . . .	44 62
Hopkinton, ...	35 75	Sudbury, ...	15 75
Marlborough, . . .	39 50	Wayland, ...	25 75
Natick, ...	44 49	Total, . . .	$574 22

MIDDLESEX NORTH.

Chelmsford, . . .	$101 25	Lowell, . . .	$355 37
Billerica, ...	16 00	Lawrence, ...	10 00
Dracut, ...	92 00	North Andover, . . .	40 00
Dunstable, ...	83 00	North Reading, . . .	110 00

MIDDLESEX NORTH—Continued.

Tewksbury,	$43 00	Wilmington,	$26 00
Tyngsborough,	23 50	Woburn,	10 00
Westford,	8 00	Total,	$917 12

WORCESTER.

Auburn,	$7 00	Northborough,	$12 00
Barre,	116 00	North Braintree,	9 00
Berlin,	2 00	Oakham,	3 00
Boylston,	5 00	Oxford,	6 00
Boston,	2 00	Petersham,	15 00
Bolton,	9 76	Princeton,	80 00
Charlton,	40 00	Shrewsbury,	62 00
Dana,	3 00	Southborough,	11 44
Dudley,	3 50	Sutton,	111 00
Grafton,	14 00	Uxbridge,	14 00
Harvard,	1 50	Webster,	6 00
Holden,	6 00	Westborough,	43 00
Leicester,	11 00	West Boylston,	14 00
Millbury,	53 00	Worcester,	340 50
Milford,	7 00	Total,	$978 50

WORCESTER WEST.

Barre,	$240 99	Hardwick,	$36 75
Bernardston,	15 00	Hubbardston,	1 00
Charlton,	19 00	New Braintree,	30 00
Dana,	3 00	North Brookfield,	4 00
Hartford,	1 00	Oakham,	20 00

WORCESTER WEST—Continued.

Petersham,	$20 62	Templeton,	$12 00
Phillipston,	13 50	West Brookfield,	1 50
Princeton,	49 50	Worcester,	3 75
Shrewsbury,	1 50	Total,	$472 11
Sturbridge,	1 00		

WORCESTER NORTH.

Ashburnham,	$8 50	Princeton,	$174 79
Ashby,	6 75	Shirley,	26 00
Fitchburg,	329 34	Sterling,	14 83
Leominster,	47 75	Templeton,	6 00
Lunenburg,	28 00	Westminster,	31 00
Pepperell,	7 00	Total,	$701 96
Phillipston,	22 00		

WORCESTER SOUTH.

Brimfield,	$32 00	Southbridge,	$58 75
Brookfield,	2 00	Sturbridge,	108 00
Charlton,	54 00	Wales,	3 00
Dudley,	16 00	Ware,	3 00
Holden,	2 00	Warren,	15 00
Holland,	4 00	Webster,	1 00
North Brookfield,	4 00	Total,	$302 75

HAMPSHIRE, FRANKLIN AND HAMPDEN.

Amherst,	$4 00	Chesterfield,	$7 00
Buckland,	4 00	Conway,	21 00

HAMPSHIRE, FRANKLIN AND HAMPDEN—Continued.

Cummington, ...	$9 00	Northampton, . .	$216 00
Easthampton, ...	54 25	Shelburne, ...	5 00
Goshen, ...	8 00	South Hadley, . . .	107 00
Granby, ...	18 00	Southampton, . . .	45 50
Greenfield, ...	9 00	Sunderland, ...	16 50
Hadley, ...	97 50	Westfield, ...	82 00
Hatfield, ...	63 00	Westhampton, . . .	6 00
Hinsdale, ...	1 00	Whately, ...	10 00
Holyoke, ...	1 00	Williamsburg, . . .	7 00
Huntington, ...	5 00	Worthington, . . .	5 00
Montgomery, . . .	1 00	Total, . . .	$802 25

HAMPSHIRE.

Amherst, . . .	$152 68	Northampton, . . .	$2 00
Belchertown, . . .	22 25	Pelham, ...	23 25
Charlemont, ...	2 50	Plainfield, ...	50
Deerfield, ...	7 00	Shelburne, ...	3 00
Granby, ...	17 25	South Hadley, . . .	41 00
Greenfield, ...	3 00	Springfield, ...	25
Hadley, ...	63 64	Sterling, ...	2 00
Leicester, ...	20	Sunderland, ...	87 28
Leverett, ...	31 30	Vernon, ...	1 00
New Salem, ...	1 00	Worcester, ...	3 00
New York, ...	75	Total, . . .	$466 85

HAMPDEN.

Agawam, ...	$17 25	Blandford, . . .	$10 00
Brimfield, ...	1 00	Chicopee, . . .	118 50

HAMPDEN—Continued.

Granville,	$3 00	West Springfield,	$15 00
Holyoke,	12 50	Westfield,	65 00
Ludlow,	8 00	Wilbraham,	114 00
Longmeadow,	57 00	Total,	$716 07
Springfield,	264 82		

HAMPDEN EAST.

Belchertown,	$12 00	Wales,	$10 00
Brimfield,	25 50	Ware,	9 00
Holland,	5 00	Warren,	16 00
Ludlow,	7 00	Wilbraham,	52 00
Monson,	118 25	Total,	$450 50
Palmer,	195 75		

FRANKLIN.

Ashfield,	$0 50	Leverett,	$2 00
Bernardston,	12 00	Leyden,	2 00
Buckland,	6 00	Montague,	15 00
Charlemont,	2 00	Northfield,	25 00
Chicopee,	5 00	Orange,	2 00
Coleraine,	22 00	Shelburne,	205 00
Conway,	30 00	Shutesbury,	5 00
Deerfield,	96 00	Sunderland,	40 00
Gill,	16 00	Total,	$587 50
Greenfield,	102 00		

BERKSHIRE.

Adams,	$75 00	Lenox,	$130 00
Alford,	13 50	Monterey,	2 00
Becket,	12 00	New Ashford,	3 00
Boston,	3 00	Pittsfield,	344 50
Cheshire,	39 00	Richmond,	64 00
Dalton,	20 00	Sheffield,	29 50
Egremont,	16 50	Stockbridge,	140 00
Great Barrington,	36 50	Washington,	1 00
Hancock,	3 50	West Stockbridge,	14 00
Hinsdale,	13 00	Williamstown,	20 00
Lanesborough,	135 00	Windsor,	7 50
Lee,	36 50	Total,	$1,159 00

HOUSATONIC.

Alford,	$22 50	Otis,	$2 00
Becket,	3 00	Pittsfield,	3 00
Egremont,	109 00	Richmond,	23 50
Great Barrington,	251 00	Sandisfield,	12 00
Lanesborough,	5 00	Sheffield,	169 50
Lee,	25 00	Stockbridge,	120 50
Lenox,	69 50	Tyringham,	1 00
Monterey,	25 50	West Stockbridge,	23 00
New Marlborough,	14 00	Total,	$879 00

NORFOLK.

Bellingham,	$3 00	Brookline,	$16 00
Braintree,	10 00	Canton,	3 00

NORFOLK—CONTINUED.

Dedham,	$135 00	Needham,	$56 00
Dorchester,	48 00	Randolph,	3 00
Dover,	45 00	Roxbury,	20 00
Foxborough,	5 00	Sharon,	8 00
Franklin,	5 00	Walpole,	26 00
Medfield,	58 50	West Roxbury,	101 50
Medway,	51 50	Wrentham,	38 00
Milton,	20 00	Total,	$652 50

PLYMOUTH.

Abington,	$43 75	Marshfield,	$7 75
Bridgewater,	314 75	Middleborough,	206 55
Carver,	7 00	North Bridgewater,	119 50
Duxbury,	4 25	Pembroke,	26 85
East Bridgewater,	114 75	Plymouth,	65 80
Halifax,	104 50	Plympton,	39 15
Hanover,	3 75	Rochester,	9 75
Hanson,	11 50	Scituate,	9 55
Hingham,	5 00	Wareham,	11 50
Kingston,	15 00	West Bridgewater,	173 00
Lakeville,	9 75	Total,	$1,303 40

BRISTOL.

Attleborough,	$47 00	Fairhaven,	$11 00
Berkley,	26 50	Fall River,	57 00
Dighton,	2 25	Freetown,	75
Easton,	6 75	Mansfield,	24 00

BRISTOL—CONTINUED.

New Bedford,	$50 50	Seekonk,	$30 50
Norton,	73 25	Somerset,	8 00
Pawtucket,	3 00	Taunton,	350 75
Raynham,	197 25	Westport,	18 62
Rehoboth,	26 25	Total,	$933 37

BARNSTABLE.

Barnstable,	$360 75	Orleans,	$8 00
Brewster,	5 00	Sandwich,	48 75
Chatham,	12 50	Yarmouth,	37 25
Dennis,	3 75	Unknown,	3 00
Eastham,	9 63	Total,	$496 37
Harwich,	7 75		

NANTUCKET.

Nantucket,	$157 00

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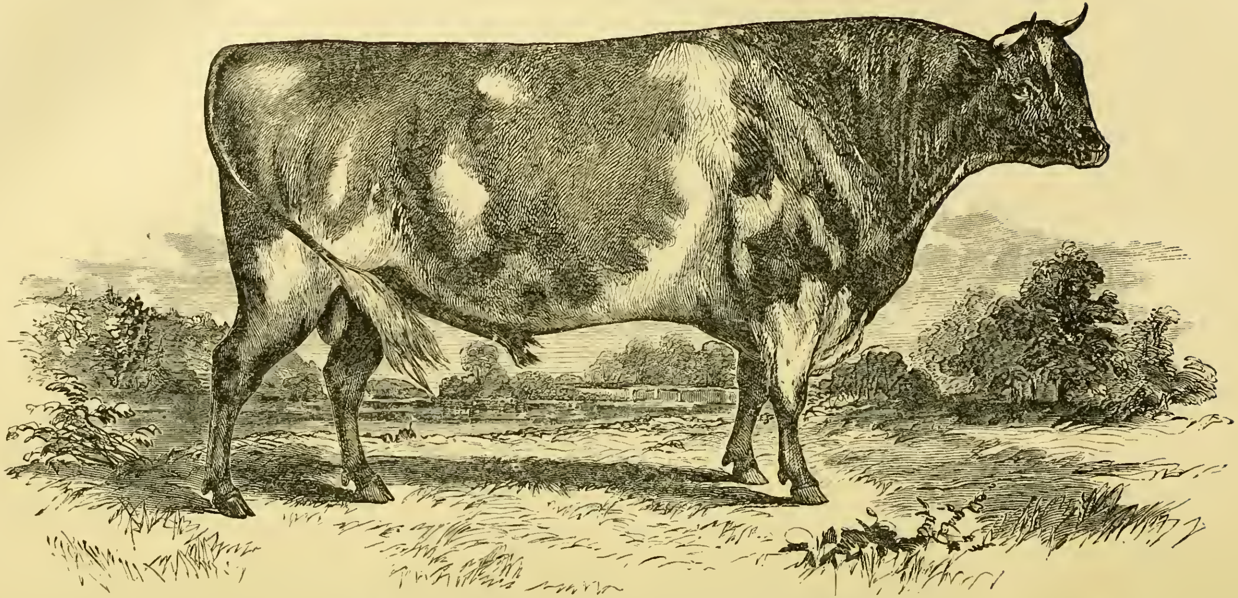

ESSEX," AYRSHIRE, owned by DR. GEO. B. LORING, Salem   See Preface.

ABSTRACT OF RETURNS

OF THE

AGRICULTURAL SOCIETIES

OF

MASSACHUSETTS,

1858.

EDITED BY

CHARLES L. FLINT,

SECRETARY OF THE STATE BOARD OF AGRICULTURE.

BOSTON:

WILLIAM WHITE, PRINTER TO THE STATE.

1859.

PREFACE.

The same arrangement has been followed in the Abstract of the returns of the societies, as that adopted in the preceding volumes, that having been found to be, on the whole, the most logical and convenient. But the necessity of condensing more and more has been apparent from the fact that so little that is really new has been presented, or that what has been presented has appeared in too indefinite a form to be of any general practical value.

Suppose, for instance, a farmer in one section of the Commonwealth offers a statement on some particular crop, and in giving the preparation of the land the previous years uses the term, "loads of manure," without describing what he means by loads. How is a farmer in another section to know how much was applied? In one section, the most common conveyance is the horse cart, in another an ox cart, and in another a load may mean a cord; so that the term used conveys no definite and correct idea of how the land was manured. And yet such statements appear to be the rule rather than the exception, and they deserve no place in a volume designed for general use. It is earnestly hoped that this loose way of making such statements will be avoided in future, and

the secretaries of the various societies, through whose hands they must all pass, can do much towards correcting this looseness.

I acknowledge with pleasure the kindness of the Harvest Club, of Springfield, and of Dr. George B. Loring, in furnishing the correct and beautiful cuts of animals which adorn this volume. "Double Duke" is well known in the section where he is owned. He was bred by J. M. Sherwood, Esq., of New York, calved June 6, 1855, of a roan color, sired

By "3d Duke of Cambridge," 5,941.

Dam, "Red Rose 5th," by "3d Duke of Cambridge," 5,941.

G Dam, "Red Rose 2d," by "Napier," 6,238.

G gr Dam, "Tube Rose," by "South Durham," 5,281.

G gr gr Dam, "Rose Ann," by "Bellerophon," 3,119.

G gr gr gr Dam, "Rosette," by "Belvidere," 1,706.

G gr gr gr gr Dam, "Red Rose," by "Waterloo," 2,816.

G gr gr gr gr gr Dam, "Moss Rose," by "Baron," 54.

G gr gr gr gr gr gr Dam, "Angelina," by "Phenomenon," 491.

G gr gr gr gr gr gr gr Dam, "Anna Boleyne," by "Favorite," 252.

G gr gr gr gr gr gr gr gr Dam, "Princess," by "Favorite," 252.

G gr gr gr gr gr gr gr gr gr Dam, "Bright Eyes," by "Favorite," 252.

G gr gr gr gr gr gr gr gr gr gr Dam, "Bright Eyes," (bred by Alexander Hall,) by "Hubback," 319.

G gr gr gr gr gr gr gr gr gr gr gr Dam, "Bright Eyes," by Snowden Bull, 612.

G gr gr gr gr gr gr gr gr gr gr gr gr Dam, "Beauty," (bred by Thos. Hall,) by Masterman Bull, 422.

G gr gr gr gr gr gr gr gr gr gr gr gr gr Dam, "Dutchess of Athol," by Harrison Bull, 292.

G gr gr gr gr gr gr gr gr gr gr gr gr gr gr Dam, "Tripes," (bred by Mr. Pickering,) by Studley Bull, 622.

G gr gr gr gr gr gr gr gr gr gr gr gr gr gr gr Dam was bred by Mr. Stephenson, of Ketton, in the year 1739.

"Essex," the pure bred Ayrshire, owned by Dr. Loring, is a very superior animal, described in the report of the committee of the Essex Agricultural Society, on page 244 of this volume. He was out of "Strawberry," an Ayrshire cow, imported by C. A. Stetson, Esq., by a bull of the importation of Captain Randall, of New Bedford.

The financial returns of the societies will be found in the Appendix of my Sixth Annual Report.

C. L. Flint.

Boston, March 25, 1859.

OFFICERS OF THE AGRICULTURAL SOCIETIES, 1859.

MASSACHUSETTS.

President—GEORGE W. LYMAN, of Boston.
Secretary—RICHARD S. FAY, of Boston.

ESSEX.

President—DANIEL ADAMS, of Newbury.
Secretary—ALLEN W. DODGE, of Hamilton.

MIDDLESEX.

President—JOHN S. KEYES, of Concord.
Secretary—JOSEPH REYNOLDS, of Concord.

MIDDLESEX SOUTH.

President—C. C. ESTY, of Framingham.
Secretary—HENRY ORNE STONE, of Framingham.

MIDDLESEX NORTH.

President—JOHN C. BARTLETT, of Chelmsford.
Secretary—S. J. VARNEY, of Lowell.

WORCESTER.

President—WILLIAM S. LINCOLN, of Worcester.
Secretary—JOHN A. DANA, of Worcester.

WORCESTER WEST.

President—EDWARD DENNY, of Barre.
Secretary—CHARLES BRIMBLECOM, of Barre.

WORCESTER NORTH.

President—JABEZ FISHER, of Fitchburg.
Secretary—WM. G. WYMAN, of Fitchburg.

WORCESTER SOUTH.

President—O. C. FELTON, of Brookfield.
Secretary—SAMUEL H. HOBBS, of Sturbridge.

HAMPSHIRE, FRANKLIN AND HAMPDEN.

President—T. G. HUNTINGTON, of Hadley.
Secretary—H. K. STARKWEATHER, of Northampton.

HAMPSHIRE.

President—WILLIAM P. DICKINSON, of Hadley.
Secretary—JAMES W. BOYDEN, of Amherst.

HAMPDEN.

President—GEORGE BLISS, of Springfield.
Secretary—A. A. ALLEN, of Springfield.

HAMPDEN EAST.

President—JOSEPH RAMSDALE, Jr., of Warren.
Secretary—GEORGE ROBINSON, of Palmer.

FRANKLIN.

President—Z. L. RAYMOND, of Greenfield.
Secretary—JAMES S. GRENNELL, of Greenfield.

BERKSHIRE.

President—BENJ. F. MILLS, of Williamstown.
Secretary—THOMAS COLT, of Pittsfield.

HOUSATONIC.

President—D. D. KENDALL, of Stockbridge.
Secretary—SAMUEL B. SUMNER, of Great Barrington.

NORFOLK.

President—MASHALL P. WILDER, of Dorchester.
Secretary—H. O. HILDRETH, of Dedham.

BRISTOL.

President—NATHAN DURFEE, of Fall River.
Secretary—LEMUEL T. TALBOT, of Taunton.

PLYMOUTH.

President—CHARLES G. DAVIS, of Plymouth.
Secretary—WILLIAMS LATHAM, of Bridgewater.

BARNSTABLE.

President—S. B. PHINNEY, of Barnstable.
Secretary—GEORGE MARSTON, of Barnstable.

NANTUCKET.

President—EDWARD W. GARDNER, of Nantucket.
Secretary—JOHN B. KING, of Nantucket.

MARTHA'S VINEYARD.

President—LEAVITT THAXTER, of Edgartown.
Secretary—HENRY L. WHITING, of West Tisbury.

EXHIBITIONS OF 1859.

Essex, at Danvers,	September 28 and 29.
Middlesex, at Concord,	September 28.
Middlesex South, at Framingham,	September 20 and 21.
Middlesex North, at Lowell,	September 21.
Worcester, at Worcester,	September 28 and 29.
Worcester West, at Barre,	September 27.
Worcester North, at Fitchburg,	September 29 and 30.
Worcester South, at Sturbridge,	September 28.
Hamp., Franklin and Hampden, at Northampton,	September 28 and 29.
Hampshire, at Amherst,	October 13 and 14.
Hampden, at Springfield,	September 21 and 22.
Hampden East, at Palmer,	October 4 and 5.
Franklin, at Greenfield,	September 27 and 28.
Berkshire, at Pittsfield,	October 5, 6 and 7.
Housatonic, at Great Barrington,	September 28 and 29.
Norfolk, at Dedham,	September 27 and 28.
Bristol, at Taunton,	September 14 and 15.
Plymouth, at Bridgewater,	October 5 and 6.
Barnstable, at Barnstable,	October 5 and 6.
Nantucket, at Nantucket,	October 12 and 13.
Martha's Vineyard, at West Tisbury,	October 11 and 12.

AGRICULTURE OF MASSACHUSETTS.

THE DUTIES AND OPPORTUNITIES OF AN AGRICULTURAL SOCIETY.

From an Address before the Essex County Agricultural Society, Sept. 30, 1858.

BY GEORGE B. LORING.

It was not simply, gentlemen, to excite a spirit of emulation in the farmers of this county,—it was not to create a rivalry here which might end in enriching the soil and embittering the people,—it was not to record a chapter of fortunate accidents, a long list of mammoth fruits and monster animals,—it was not to encourage an ill-regulated and unprofitable strife for excellence, that our fathers founded this society in which we take pride, as in a rich inheritance. Do you suppose the wise and practical patriot and statesman, whose lofty duties in the service of his country established an intimacy between the planter of Mount Vernon and the farmer of Wenham, Hon. T. Pickering, which gave a glowing dawn to our rising republic, and shed the golden sunset hues of these great lives over American agriculture, had no higher aim than this, when he gave the first impulse to our foundation? It was the recorded experience of more than a quarter of a century which he desired to accumulate, and we are now living to enjoy the realization of those hopes with which his mind was filled. His dreams are our realities. Year after year the work has been going on, until the farmers of this county have the classics and text-books of their education in the pages of your Transactions. Here, on

this very soil, those facts have been gathered, which are important to the daily life of every man who dwells upon this same corner of the earth, and under this same arch of the sky. Could those men, who, when this society was formed, felt that a clay farm was a reproach and a stumbling block to agriculture,—whose chiefest agricultural skill consisted in selecting the choicest soils,—whose knowledge of manures extended hardly beyond their own barnyards,—whose surface drainage destroyed the symmetry of their "meadows and fields,"—whose machinery consisted in the intelligence and untiring industry of the farm labor of those days, and whose success in agriculture in spite of all obstacles, should teach us a most encouraging lesson; could those men have pondered over the record of under-draining and deep ploughing,—could they have studied the experiments made with all the fertilizers which sea and land have furnished from their ample stores,—could they have learned how labor may be lightened and all farming operations be facilitated by labor saving machines,—could their thoughts have been stimulated and instructed by the records of this society, if by nothing more, would not the dark corners in which they were groping have been filled with the light of noon-day?

For I look upon an agricultural society as in the highest sense an agricultural school, in which all are teachers, and all are pupils. And in this lies its most important duty. The best professor of agricultural chemistry, is he who comes embrowned from the compost heap, which by judicious application has forced a hundred bushels of corn from each of his well cultivated acres. The best teacher of the art of tilling the soil, is he who has by long experience become acquainted with the habits of plants, from their tenderest infancy to the ripened harvest. The best expounder of agricultural truths is he who has learned by diligence and perseverance, with a liberal and inquiring mind, what those economies are which give success to the farmer. The best farmer is he, who while he becomes intimate with the laws of nature, and learns her mysteries so far as she will reveal them, has a quick eye for those useful discoveries and inventions which the ingenuity of man is constantly laying at the feet of agriculture. And herein lies the great end of agricultural education, get it where you will, from

the school, or the club, or from those societies which excite investigation and experiment by the stimulus of competition.

And it is difficult for agricultural education to go further. For agriculture has not yet become a fixed science. Men begin to vaunt themselves upon their success in supplying the human race with food, when a mysterious disease invades one great staple of their productions, and year after year rolls on without revealing to the anxious explorer the slightest remedy. One of the illustrious minds of the age applies the full power of science to supplying the deficiencies of every soil, and to furnishing each plant with its own peculiar food, but is finally obliged to acknowledge that the relation existing between the earth and the fruits thereof is not to be entirely reached by any human power.

The science of agriculture is therefore of all sciences the most uncertain, whenever you would pass beyond the bounds of actual experience. The details of farming may indeed be taught. The use of the implements of husbandry is something that must be learned. A knowledge of the proper rotation of crops, and of the adaptation of soils to the vegetable kingdom, comes from teaching and observation. The rules applicable to the proper proportions of animals may be got in the schools. Building and draining and planting and fertilizing, may all be instilled into the mind, until the student of agriculture may go forth ready to subdue the hardest soil, and filled with tastes which will make his farm agreeable to the eye, as well as an addition to the wealth of the community. So far perhaps agriculture may be made a science. And so far, an agricultural society is capable of furnishing the principles of that science.

In such a school as this, who are the professors and teachers? Is not every member who contributes his mite to the treasury of knowledge? I have seen a young man in our own county who by care and diligence and skill and method, has procured year after year, from soil yielding previously hardly enough to pay its taxes, a crop of turnips which gave him a handsome annual income. Is not this young man a good teacher in the science of agriculture? I have seen one of the most thriving towns in this section of the State enriched, until its whole population appears to be elevated above the thought

of want, by a skilful devotion to its onion crop. Have the farmers of that town no claims to be considered capable professors in the school of agriculture? I have known an old orchard not far from us, to be brought from a state of almost hopeless decay and barrenness, to the most abundant bearing, by patient and continued cultivation. Is not this actual fact, established here in our own borders, a lesson which every farmer in this county can learn, and by which he can profit? I have admired from my childhood the fruitful fields, and the agricultural system of an ample farm in one of your towns, and have learned from it that there is in our own population, a capacity for farming which is surpassed in no section of our country. I have thought a better agricultural school than this farm could not be found. I have before me also, that most valuable of all citizens, one of what are called the yeomanry of our country. A farmer, born and educated to his calling, and filled with determination to discharge his duty well. The virtues of a New England home gave tone and direction to his earliest impulses. The sharp and bracing air of his native hills nerved his arm, and knit his manly frame into that sturdy symmetry which his destiny demands. Amidst the conflicts and trials, amidst the joys and sports of the district school, he laid the foundation of his knowledge, without advancing into that realm of letters which is beset with the snares of ambition, and is surrounded by all the temptations which the high mountains of society are sure to reveal. The great book of nature lies always open before him, and the relation which exists between the earth and its cultivator is the first lesson he learns from its pages. The capacity of his native soil becomes as familiar to his growing eye as the careworn form of his industrious father, from whom he learns year by year the practical business of agriculture. Among the animals of the farm he walks supreme and applies an unerring instinct to his estimate of their quality, and to the work of rendering them obedient to his will. He learns not only the art of tilling the earth, but the demands of the community in which he lives; and as he advances to that position which he is born to fill, he finds that the experience of his fathers, and the recorded trials of his neighbors constitute that science which he is most eager to learn. As he goes on in life, a busy world responds to his

inquiries. The agricultural societies, which, in the best farming countries in the old world and the new, are founded for the benefit of all men like himself, pour forth their treasures at his feet. Subjected to his treatment, his ancestral acres unfold new riches at his hands, and he becomes, as he goes on in life, the impersonation of successful, economical, progressive agriculture. Will not this man, as a member of our society, serve as a teacher of the best truths of agricultural science?

In estimating as I do, the value of the farmer as a teacher of agriculture, both in his private capacity and as an active member of a society, I would not be understood as opposed to agricultural schools and colleges. There is no royal road to learning, in any of its branches. I have no doubt that a thorough agricultural education would save much misapplied time and labor and capital. I have no doubt that it would accelerate the progress of agriculture. I can easily imagine the effect it would have upon the farming interests of our own county, not only by the universal influence it would exercise, but by the stimulus it would give the leading and prominent members of the profession. It would make the good farmers better, and the poor ones good. And I can easily understand the advantages which those practical teachers of agriculture whom I have designated, might have derived from a thorough knowledge of the general principles taught in schools, not only by means of the actual acquirements and the increased wisdom given by culture, but also by means of that freedom from prejudice and that liberal spirit of inquiry and progress which lie at the foundation of all true success, and have enriched and elevated mankind by the patient toils of invention, and by the brilliant and startling achievements of discovery, and which education alone can give.

But then, gentlemen, comes the immense power of example. Why, I can take you to sections of your own county, where the quiet and unobtrusive efforts of a sagacious, industrious, prudent farmer have operated like contagion upon all about him, until he has become one of a community of thriving farmers. His well cultivated and fruitful fields, his carefully pruned orchards laden with fruit, his thrifty and profitable cattle, his well ordered buildings, his walls and fences a protection to his lands, all lie like an open book before his neighbors, so that "he who runs may read." His farm is a treatise on

agriculture which every man can comprehend, and which all men delight to study. He is every day teaching by example, and is illustrating, moreover, that view which I have taken of an agricultural society as one of the best of agricultural schools.

That this kind of teaching is not in vain, let us look over this little section of the country which contains the farming interest represented by this society. Here in Essex county, we have every kind of industry to tempt us away from agriculture; and yet in this county, inclosing four large cities, flourishing towns, busy villages, with every inducement to neglect the soil, our people have taken a high stand as intelligent and enterprising farmers. In the cultivation of root crops and vegetables, we have not been surpassed, as the premiums awarded at the last horticultural exhibition in Boston, will testify. The largest recorded amount of carrots upon an acre were raised in this very town where I am now speaking. Nowhere has the onion been cultivated with more skill and profit, than on these fields directly about us. The application of sea manure of all descriptions to the soil, has been carried to the highest perfection along our coast. Some of the best experiments in improving cattle and sheep have been made upon our farms. In horticulture and pomology, the names of Cabot, and Manning and Ives, are quoted as authority. Whoever has heard of the liberal and energetic President of our Society, knows that at Lynmere there is a growth of forest trees planted by his hand, which is almost unequalled as "a thing of beauty," and as a triumph of skill over a hard and sterile soil. I can show you, on the shore of Beverly, the best arranged farm buildings that can be found perhaps in New England, taking them together; and you will find there as choice a collection of cows as can be seen anywhere, and I think decidedly the finest Suffolks and flock of Dorkings that can be found this side of the royal farm at Windsor, from whence they came. Not far from us, overlooking our very show ground is a green-house and grapery, which Mr. Paxton might envy, even among the costly edifices of his lordly master at Chatsworth. Our experiments in under-draining have become so extensive, that a manufactory of tiles has been established in the county. At a trial of mowing machines during the past summer, on my farm, six different

inventions were brought upon the ground almost at a day's warning, and since that time, two others have been sent to me for introduction to our farmers who are becoming proverbial for their enterprise in the use of machinery. We have at our exhibition to-day, one of only two tedders that have been imported into this country—a machine, which in the simple matter of spreading hay, is of inestimable value to every farmer who would secure this important crop thoroughly, rapidly and economically.

I will not say that all these agricultural improvements, these indications of an agricultural ambition among us, have been brought about by our society; but I am proud to say there is not one of them which has not been encouraged by its liberality. The competition it has excited in mowing machines alone, has aided in a very great degree, the development of an instrument of labor from one degree of perfection to another, until our farmers have the prospect before them of being able to resign the scythe with all its hard toil, and with the constantly increasing expense attending its use. And will our horticulturists, our breeders of cattle, our reclaimers of waste lands, our cultivators of field crops, say that they have not been stimulated by our society and enlightened by its publications?

I consider, therefore, this collection of practical knowledge, as one of the highest duties our society has to perform. I would have it continued by every means within our power, consistent with prudence and economy. I am confident that by a faithful discharge of this duty, we shall find our whole farming community advancing in intelligence and prosperity, and developing those resources which lie hidden in our soil. And I am encouraged to believe this, when I look abroad and see what other similar associations have done, and what they indicate. In England, where agriculture has reached a degree of perfection unknown elsewhere, the greatest attention is paid to agricultural societies. The meetings of the Royal Agricultural Society are thronged by an interested crowd of husbandmen, who have felt the effects of this noble institution upon all their interests. In 1857, the number of visitors to the show at Salisbury amounted to over thirty-five thousand, all learners in a school which first roused the English mind to the true value of artificial manures—to the necessity of under-drainage—

to the importance of a thorough and careful investigation of the best method of feeding animals, and to the most successful modes of cultivation. It is impossible for me to lay before you all that this society has done to remove the prejudices and awaken the minds of the English farmers, both by its publications, and by its exhibitions of machinery which has been actually used upon the farm, of cattle which have been improved beyond a doubt in England, of products which high farming has brought forth upon that very soil. Let me tell you that one great era in English agriculture dates from the opening of this society in 1839, when, as has been truly said, "farmers began to be familiarized with men of science, and men of science learned not to despise agricultural experience." It was an era also in our own agriculture, when the establishment of societies made famers familiar with each other, and opened their minds to the importance of their occupation.

It belongs to us to cherish by every means in our power, a fraternity of feeling among our farmers. In this respect, every form of associated agricultural effort is of the highest importance. A town that sustains a farmer's club is sure to have its due proportion of good farmers. What invaluable allies to a county society they might be made! Local fairs cannot be too highly estimated, both as a means of bringing farmers together, and also as furnishing an opportunity for purchase, sale and interchange; and I trust the day is not far distant when the judicious recommendation made to you by your President, will be so far carried out, as to result in the establishment of monthly, if not weekly fairs, in some convenient location in the county. Let us in every way create a community of feeling here, a sort of *esprit du corps*, a desire to talk with each other, a desire to trade with each other, a determination to cultivate our own minds and supply our own markets, and Essex county will soon become as distinguished for its agriculture, as it now is for its wealth and enterprise in commerce, manufactures and the mechanic arts.

Above all things, it is our duty to be in the ordinary term of rather an uneasy age, sufficiently progressive. When I consider the alacrity with which every invention and every new branch of agriculture have been recognized, the liberal rewards which have been offered for all improvements, the generous consid-

eration which has been shown careful breeders of our most valuable farm animals and the attention which has been aroused by the published essays of the society, I cannot but look with pride upon an association which seems blessed with perpetual youth, tempered with the wisdom and judgment of mature manhood. An agricultural society which has discriminated between the different uses of the animal kingdom, deserves all praise. It has a due regard for all the interests which come under its cognizance. One of its great objects is the encouragement of breeding valuable animals for the profit of the farmer and for the advantage of the community, whether it be for the dairy, for draught, or for driving. In all this, it is observant of the most important interests submitted to it, and is as truly progressive in its recognition of all classes of animals as it is in the reward it offers the various branches of farming. It is the legitimate use of animals, and the legitimate growth of crops with which it is concerned. Our society offers liberal premiums for bulls—does it follow that we must have a bull-fight at every annual exhibition? We all value the horse and have encouraged the breeding of this important animal with ample rewards; will the most intelligent judges among us say that they require the trials of the track, in order to make up their decisions? All these things have their place, but it is not exactly at a farmers' exhibition. Not that I would have our society discontinue the liberal encouragement it has always extended to the development of the American trotting horse, than which no animal is wiser, more enduring and patient, more courageous, nor more defiant of all obstacles. Let us, as a society, encourage still the attention our farmers are giving those useful animals, and if any man doubts the benefit to be derived from it, let him witness the extraordinary success one of our own Essex farmers has met with by the exercise of that judgment and skill which have enabled him to produce a Childers, and to fill his stables with a collection of colts unequalled as a whole, from which one yearling animal has been sold at a price greater than was ever before obtained in New England. Let us do this, and I think we shall be progressive enough for the most ardent lover of horse flesh in the country; let us continue the encouragement we have always offered the

legitimate improvements of agriculture, and I think we shall be progressive enough for the most zealous farmer in the country.

And now, gentlemen, let me say a word with regard to the opportunities we possess for discharging these duties to which I have referred. By a long and honorable career, our society has secured a position, which by elevating its influence multiplies its chances for effort. I believe you will all agree that it has won the respect of the farmers of our county, and of the community generally. It has been deemed worthy of the most liberal consideration of many of our best citizens. A valuable library has in this way been collected which furnishes constant opportunity for reference and information. And a large agricultural interest has learned to be stimulated by our rewards and instructed by our advice and counsel.

But above all, our association has been deemed a worthy recipient of one of the best farms in our county, a legacy bequeathed to us for the promotion of the science of agriculture. I think I do not estimate this bequest from Dr. Treadwell too highly, when I look upon it, not only as a compliment to the reputation we have won as a society, but as by far the most valuable means we possess for carrying on the work we have begun. A farm for experiment and observation—how much is involved in this design! Under the care of an intelligent farmer, and conducted by a competent committee, the accumulation of facts which may be made there, must be full of interest and instruction. We may learn within our own borders, if we will, the changes of the seasons, from year to year, the chances of crops in our latitude, the cultivation best adapted to our soil, the effects of manures, the expense and benefits of drainage, the relative value of products, without incurring that expenditure of time and money which renders experimental farming so hazardous and so generally unprofitable. I trust this golden opportunity will not be wasted; and I most earnestly urge upon you the adoption of a system which shall render the records of the Treadwell farm an addition to our agricultural literature, which shall be creditable to ourselves and profitable to those, who, coming after us, assume our duties and inherit our opportunities.

THE FARMER AND HIS AIDS.

From an Address before the Middlesex Agricultural Society, Sept. 29, 1858.

BY RALPH WALDO EMERSON.

Mr. President, Ladies and Gentlemen:—I suppose there is no anniversary that meets from all parties, a more entire good will than this rural festival. Town and country, trader and manufacturer, clerk and layman, sailor and soldier, men and women, all have an equal stake in the prosperity of the farmer. It is well with all when it is well with him. He has no enemy, and all are loud in his praise. Every wise State has favored him, and the best men have held him highest. Cato said, when it was said that such or such a man was a good husbandman, it was looked upon as the very highest compliment. Of all the rewards given by the Romans to great public benefactors, the most valued and the rarest bestowed, was the crown of grass, given only by the acclamation of the army for the preservation of the whole army, by the valor of one man. Since the dependence, not of the whole army, but of the whole State, rests on the tiller of the ground, the *arvel* crown, the crown of grass should be more rightfully awarded to the farmer. Let us then look at the condition of the farmer, or the man with the hoe, at his strength and weakness, at his aids and servants, at his greater and lesser means, and his share in the great future which opens before the people of this country.

The glory of the farmer is that it is his to construct and to create. Let others borrow and imitate, travel and exchange, and make fortunes by speed and dexterity in selling something which they never made, all rests at last upon his primitive activity. He stands close to nature; obtains from the earth bread; the food which was not, he has caused to be. And this necessity and duty give the farm its dignity. All men feel this

to be their natural employment. The first farmer was the first man, and all nobility rests on the possession and use of land. Men do not like hard work very well; but every man has an exceptional respect for tillage, and a feeling that this is the original calling of his race; that he himself is only excused from it by some circumstance which made him delegate it for a time to other hands. If he has not some skill which recommends him to the farmer, some product which the farmer will give him corn for, he must himself return to his due place among the planters of corn. The profession has its ancient charm of standing nearest to God, the First Cause. Then the beauty of nature, the piety, the tranquillity, the innocence of the countryman, his independence, and all the pleasing arts belonging to him, the care of bees, of poultry, of sheep, of cows, the dairy, the care of hay, of fruits, of trees, and the reaction on the workman, in giving him a strength and plain dignity, like the face and manners of nature, all men are sensible of. All of us keep the farm in reserve as an asylum where to hide our poverty and our solitude, if we do not succeed in society. Who knows how many remorseful glances are turned this way from the competitions of the shop and counting-room, from the mortifying cunning of the Courts and the Senates. After the man has been degraded so that he has no longer the vigor to attempt active labor on the soil, yet when he has been poisoned by town life and drugged by cooks, and every meal is a force-pump to exhaust by stimulus the poor remainder of his strength, he resolves; "Well, my children, whom I have injured, shall go back to the land to be recruited and cured by that which should have been my nursery and shall now be their hospital."

The farmer is a person of remarkable conditions. His office is precise and important, and it is of no use to try to paint him in rose-color. You must take him just as he stands. Nothing is arbitrary or sentimental in his condition, and therefore one respects in his office rather the elements than himself. He bends to the order of the seasons and the weather and the soils, as the sails of the ship bend to the wind. He makes his gains little by little, and by hard labor. He is a slow person, being regulated by time and nature, and not by city watches. He takes the pace of the seasons, of the plants, and of chemistry. Nature never hurries, and atom by atom, little by little, accom-

plishes her work. The lesson one learns in fishing, yachting, hunting, or in planting, is the manners of nature; patience with the delays of wind and sun, delays of the seasons, excess of water and drought, patience with the slowness of our feet, and with the littleness of our strength, with the largeness of sea and land. The farmer, or the man with the hoe, times himself to nature, and acquires that immense patience which belongs to her. Slow, narrow man—he has to wait for his food to grow. His rule is that the earth shall feed him and find him, and he must be no large and graceful spender. His spending must be a farmer's spending and not a merchant's.

But though a farmer may be pinched on one side, he has advantages on the other. He is permanent; he clings to his land as the rocks do. Here in this town, farms remain in the same families now for seven or eight generations, and the settlers of 1635 have their names still in town; and the same general fact holds good in all the surrounding towns in the county. This hard work will always be done by one kind of men; not by scheming speculators, nor by professors, nor by readers of Tennyson, but by men of strength and endurance.

The farmer has a great health, and the appetite of health, and means for his end. He has broad land in which to place his home. He has wood to burn great fires. He has plenty of plain food. His milk at least is not watered. He has sleep, cheaper, and better, and more of it, than citizens. He has grand trusts confided to him. In the great household of nature, the farmer stands at the door of the bread-room, and weighs to each his loaf. It is for him to say whether men shall marry or not. Early marriages and the number of births are indissolubly connected with abundance of food, for, as Burke said: "Man breeds at the mouth." The farmer is the Board of Quarantine. He has not only the life, but the health of others in his keeping. He is the capital of health, as his farm is the capital of wealth. And it is from him and his influence, that the worth and power, moral and intellectual, of the cities comes. The city is always recruited from the country. The men in the cities who are the centres of energy, the driving-wheels in trade or politics, or arts or letters; the women of beauty and genius, are the children or grand-children of farmers, and are spending the energies which their hard, silent life accu-

mulated in the frosty furrow, in poverty, in darkness, and in necessity, in the summer's heat and winter's cold. Then he is a benefactor. He who digs and builds a well, or makes a stone fountain; he who plants a grove of trees by the roadside, who plants an orchard or builds a durable house, or even puts a stone seat by the way side, makes the land lovely and desirable, and makes a fortune which he cannot carry with him, but which is useful to his country and mankind long afterward. The man that works at home moves society throughout the world. If it be true that not by the fiat of political parties, but by the eternal laws of political economy, slaves are driven out of Missouri, out of Texas, out of the Middle States, out of Kentucky, then the true abolitionist is the farmer of Massachusetts, who, heedless of laws and constitutions, stands all day in the field investing his labor in the land, and making a product with which no forced labor can in the long run contend. The rich man, we say, can speak the truth. It is the boast that was ever claimed for wealth, that it could speak the truth, could afford honesty, could afford independence of opinion and action, and that is the theory of nobility. But understand that it is only the rich man in the true sense, who can do this,—the man who keeps his outgo within his income.

The boys who watch the spindles in the English factories, to see that no thread breaks or gets entangled, are called "minders." And in this great factory of our Copernican globe, shifting its slides of constellations, tides and times, bringing now the day of planting, now the day of watering, now the day of reaping, now the day of curing and storing, the farmer is the "minder." His machine is of colossal proportions; the diameter of the water-wheel, the arms of the lever, the power of the battery, are out of all mechanic measure; and it takes him long to understand its abilities and its working. This pump never sucks. These screws are never loose. This machine is never out of gear. The piston and wheels and tires never wear out, but are self-repairing. Let me show you then what are his aids.

Who are the farmer's servants? Not the Irish, no, but geology, chemistry, the quarry of the air, the water of the brook, the lightning of the cloud, the castings of the worm, the plough of the frost, the winds that have blown in the intermi-

nable succession of years before he was born; the sun which has for ages soaked the land with light and heat, melted the earth, decomposed the rocks and covered them with forests, and accumulated the sphagnum which makes the peat of the meadow. The students of all nations have in the last years been dedicating their attention to universal science, and they have reformed our school-books, and our terminology. The four quarters of the globe are no longer Europe, Asia, Africa, and America, but Carbon, Oxygen, Hydrogen, and Nitrogen. The four seasons of the year are now Gravitation, Light, Heat and Electricity. Science has been showing how nature works in regard to the support of marine animals by marine plants. So nature works on the land—on a plan of all for each, and each for all. You cannot detach an atom from its holdings, or strip from it the electricity, gravity and chemic relation, and leave the atom bare; it brings with it all its ties. The flame of fire that comes out of the cubic foot of wood or coal is exactly the same in amount as the light and heat which was taken up in sunshine in the formation of leaves and roots, and now is given out after a hundred thousand years. There lie in the farm inexhaustible magazines. The eternal rocks have held their oxygen and lime undiminished and entire as they were. No particle of oxygen can run away or wear out, but has the same energy as on the first morning. The good rocks say, "patient waiters are no losers;" we have not lost so much as a spasm of the power we received.

The earth works for man. It is a machine which yields new service to every application of intellect. Every plant is a manufactory of soil. In the stem of the plant development begins. The tree can draw on the whole air, on the whole earth, on all the rolling main. The tree is all suction pipe, imbibing from the ground by its roots, from the air by its twigs, with all its might. The atmosphere is an immense distillery, drinking in oxygen and carbon from plants, and absorbing the essence of every solid on the globe. It is the receptacle from which all things spring, and into which all return. The invisible air takes form and solid mass. Our senses are sceptics, and only believe the impressions of the moment. They do not believe what is demonstrated to them—that these vast mountain chains are made of gases and rolling wind. They do not believe what

is true, that one-half of the weight of the rocks which compose the crust of the globe, of every solid substance, of the houses, of the stones of the pavement, of the soils we cultivate, and much more than half by weight of all living animals and plants, consists of oxygen. Nature is as subtle as she is strong. Her processes of decomposition and reconstruction might be followed out in higher grades of existence, rank into rank, to sentient beings. They burn with internal fire which wastes while it works. The great agencies work in man as in all.

There is no porter like gravitation, who will bring down any weight which you cannot carry, and if he wants aid, he knows where to find his fellow-laborers. Water works in masses, and sets his irresistible shoulder to your mills and your shops, or transports vast boulders of rock a thousand miles. But its far greater power lies in its capacity to enter the smallest holes and pores. By its agency the vegetable world exists, carrying in solution the elements needful to every plant. Water, that daily miracle—a substance as explosive as gunpowder—the electric force contained in a drop of water being equal in amount to that which is discharged from a thunder-cloud. I quote from the exact Faraday.

While the farmer has these grand fellow-laborers to assist him, and these majestic tools to work with, it must be owned that he is not quite competent to their direction. His servants are sometimes too strong for him. His tools are too sharp. But this inequality finds its remedy in practice. Experience gradually teaches him, and he is thoughtful. The farmer hates innovation; he hates the hoe till he tries it, preferring to scratch with a stick; he will walk till he has tried the railway car; but the oldest fogy among us, now that the Atlantic Cable is laid to London, will not send a man to swim across with his letter in his mouth. While such great energies are working for the farmer, he is also taught the great power that is in small things. It is very little that is required. 'Tis wonderful the force of a few simple arrangements. Look at the powers of a chestnut rail. Then see that prairie, hundreds of miles off, not a stick or a stone upon it, except at rare intervals. Well, the farmer manages to put up a rail fence, and at once seeds sprout and crops rise. It was only the browse and fire that kept them down. Plant a fruit tree by the roadside and

it will not produce, although it receives many hints from projected stones and sticks, that fruit is desired to come down, and though it has been swallowed crude into the robust bowels of small boys. But draw a low fence about it to keep out the cow and pig, and for thirty, forty, perhaps a hundred years, it ripens peacefully its delicate fruit, every pear, every nectarine, every cluster of grapes, inviting you to have its picture taken, before being sent to the Horticultural Fair.

Nature drops a pine cone in Mariposa, and it grows three or four centuries, producing trees thirty feet in circumference. How was it done? They did not grow on a ridge, but in a basin, where they found a deep and dry soil, and where they could protect themselves from the sun by growing in groves, and from the winds by the mountain shelter. The planter who saw them, remembered his orchard at home, where every year a destroying wind made his pears and peaches look as bleak as suffering virtue. So he went home and built a high wall on the exposed side of his orchard, and his peaches grow to the size of melons, and his vines ran out of all control.

Nay, the chemist declares that he will have a whole farm in a box a rod square; that is to say, he will take the roots into his laboratory; the vines and stems and stalks may be sprawling about the field outside; he will attend to the roots in his tub, and gorge them with food that is good for them. If they have a fancy for dead dog, he would let them have it, sure that the fruits would never reveal the secrets of their table. Such men we need to bring out a greater degree of cultivation of our soil, which is capable of as great and increased productiveness as that which England has attained. Concord is one of the oldest towns in the country,—far on now in its third century. The selectmen have once in five years perambulated its bounds, and yet in this year a very large quantity of land has been discovered and added to the agricultural land, and without a murmur of complaint from any neighbor. By drainage, we have gone to the subsoil, and we have a Concord under Concord, a Middlesex under Middlesex, and a basement story of Massachusetts more valuable than all the superstructure. Tiles are political economists. They are so many Young Americans announcing a better era, and a day of fat things. There has been a nightmare brought up in England, under the indiges-

tion of the late suppers of overgrown landlords and loomlords, that men bred too fast for the powers of the soil, that men multiplied in a geometrical ratio, whilst corn only in an arithmetical. The theory is that the best land is first taken up. This is not so, as Henry Carey, of Philadelphia, has shown, for the poorest land is the first cultivated, and the last lands are the best lands. It needs science to cultivate the best lands in the best manner. Every day a new plant, a new food is found. Thus political economy is not mean, but liberal, and on the pattern of the sun and sky; it is coincident with love and hope. It is true that population increases in the ratio of morality, and the crops will increase in a like ratio.

I congratulate the farmer of Massachusetts on his advantages. I congratulate him that he is set down in a good place, where the soil and climate yield a larger Flora than any other. A greater variety of important plants grow here than in any southern or northern latitude. We are on the northern boundary of many tropical trees, and on the southern boundary of the arctic plants. We can raise almost all crops, and if we lack the orange and palm, we have the apple, and peach, and pear. In Illinois, it is often said, although it is more the voice of their scorn than of their piety, that they reckon it a singular leading of Divine Providence that Massachusetts was settled before the prairie was known, else it would never have been settled. But the Massachusetts farmer may console himself that if he has not as rich a soil, he has the advantage of a market at his own door, the manufactory in the same town. I congratulate you, then, on this advantage of your position. Next, I congratulate you on the new territory which you have discovered, and not annexed but sub-nexed to Middlesex and to Massachusetts. I congratulate you at being born at a happy time, when the old slow ways of culture must go out with the sharp stick and the bow and arrow, when the steam-engine is in full use, and new plants and new culture are daily brought forward. I congratulate you on the fact that the year that has just witnessed the successful employment of new machines, of the mower and reaper, on the plains and prairies, has also witnessed the laying of the Atlantic Cable. The cable is laid, and the courage of man is confirmed. All that used to look like vagary and castle-building is to be solid sense henceforth. Who shall ever

dare to say impossible again? Henceforth, if a thing is really desirable, it is in that degree really practicable, and the farm you have dreamed of—go instantly and begin to make it. I congratulate you lastly, on the new political economy which takes off the crape from farms and towns and nations, and lets in the light on all we do and all we gain, and teaches that whatever is really good and useful for one man to do, is good and useful for all.

THE FARMER AND THE MAN.

From an Address before the Middlesex North Agricultural Society, Sept. 15, 1858.

BY FREDERIC HINCKLEY.

There are three ends which the labor of the farmer, like all other labor, has no answer. The first of these is to secure *the Means of Living*. A grand essential for the accomplishment of any thing in life is, of course, the continuance and support of life itself. Viewed in this light, regarding existence as deriving its value from the purposes it accomplishes, all effort for its preservation and enlargement becomes justifiable and praiseworthy. It is the different way of looking at life, in this respect, which makes much of the contrast between the plodder or the sensualist on the one hand, and the man of energy, enterprise and nobleness on the other. One is content but to live, with such pleasures as his unrefined, uncultivated capabilities enable him to appreciate; and to him life becomes a pure selfishness, or an unmitigated drudgery. The living, or the struggle for it, exhausts all his energies; and so he plods on, like the horse he rides, or the ox he goads to his daily toil, content to work and eat and sleep as they; with no ambition beyond this incessent labor, no aim but his daily fill, his animal living. While the other, valuing life for the uses to which it can be put—not only for the enjoyment that can be had from it, but for the good that may be done with it—finds himself stimulated by that to greater and more successful endeavors for the maintenance of life itself, and what is more, inevitably rises to the cherishing of a higher purpose in his toil.

Among these higher purposes is the second end of all labor, viz.: *Success in one's avocation*. By this I do not mean success in making money in it, but in exalting the character of the workmanship, perfecting the products of the labor. There is

an ambition, whose nature and action you very well understand, (for your presence and interest in this exhibition show that you are actuated by it,) which would make the work, whatever it may be, the very best of its kind. Whatever it undertakes, it does thoroughly; does in the best manner, and carries to the highest results. You remember the reply of the Boston millionaire, of the last generation, to the taunt—"I knew you when you were nothing but a drummer boy." "*Didn't I drum well?*" The doing it well—that is all that is necessary to make the humblest occupation honorable. To do it well—that is the true ambition for every worker, in field or factory, in shop or store, in church, court or congress; whether he raise corn or spin cotton, peg shoes or drive bargains, write sermons, offer pleas, or make speeches. It is this ambition which gives us eloquent preachers, distinguished lawyers, popular physicians, eminent merchants, enterprising mechanics. And, gentlemen, it is this ambition that gives us the successful farmer and the model farm; that begets the pleasant and profitable rivalry of labor and production, which spurs each one on to do his best; that annually exhibits, side by side, the results of this competition, stimulating to greater efforts and to better achievements; that multiplies agricultural societies in every county in the state and that leads the members of these associations to search out, to commend to each other and adopt every new improvement, of method or machinery, that can help them to the accomplishment of their desire. Without this ambition we should have had none of these things. The husbandman would have been a lonely plodder in the way of his fathers, pursuing, year after year, the same unenlightened course of labor, till his fields become exhausted, his orchards die out, his crops diminish, his energies flag, while nothing increases but his burdens and his cares.

But there is yet another and higher end of labor; a nobler purpose which every man's avocation should serve. Not to give him a living merely, not to inspire him with an ambition to do his best in his work; that is not all that a man's calling should do for him. But I say that, besides all this, his calling must do more for him—more than to feed and clothe him, or to honor him by his success in it. It must quicken his thought, enlarge

his conceptions, exalt his aims, strengthen his character, make him a wiser, a better and a nobler man.

The highest end, therefore, which every avocation has to serve, is the *Manhood* of its subject; a strong, thoughtful, sympathetic, upright and reverend manhood. For it is not age that makes a man. It is the full expansion and exercise of all the faculties of his nature. This expansion and exercise is the true end and aim of life. To serve that end, to secure this result, all social, educational, religious influences are to minister, each working in its own domain. The very calling a man pursues helps on this result. If as farmer, worker, trader, physician, jurist, statesman, or preacher, he is not, through the very agencies and activities of his avocation becoming a truer and nobler man, then has his avocation failed of accomplishing its highest end. It may have brought abundance. It may have conferred the honors of success. But, if with these it has narrowed and belittled the man, withered his social nature, dwarfed his mental and moral stature, (for if it have not expanded it must have contracted his spiritual being,) then in its highest purpose has it proved itself a miscarriage and a failure.

Now it seems to me, looking off from my point of observation upon the various departments of labor, that there is none more favorable to manly growth, a broad, generous development of nature's powers, than that of the cultivator of the soil. It seems to me that agriculture in a special and direct sense ought to minister to a real manhood, such as we have described: that through the farmer should come, most efficiently, the fullest outgrowth of the man. It is not that in his calling there are no hindrances, or retarding influences. For every calling has these, though in differing degrees. Yet the farmer's, I think, has less than many others, while its favoring influences are in some respects greater than those of other forms of toil.

Let me call your attention to some of the elements of manhood, which an agricultural life either directly fosters and promotes, or to some extent involves and introduces.

I. First and most palpable of these is *physical vigor*. The value of a robust constitution, bodily energy, the power of endurance, and of effort, which health and strength impart, can hardly be overestimated. They are the first essential of man-

hood. Upon these alone can the structure of a manly life be successfully reared. On these alone can it stand firm and permanent. You may build into the life splendid talents, personal refinement, social culture, high purposes; but without the broad and strongly compacted support of physical vigor, your creation ere long falls to pieces. Many a young man whose early years have been spent in mental application, to the exclusion of all physical culture—perhaps one of those whom foolish fondness, deeming too feeble for the farm, sends to college—when about to go out into life, crowned with the highest educational honors, has found that life suddenly cut off, and himself crossing the threshhold of his study, only to step into his grave. Many a toiler with head and brain in professional and even in mercantile life, to-day, if promised his first wish, would reply, give me health and strength, and with the willing spirit no longer hampered by the feeble flesh, I will accomplish my best ambition.

It is your happy lot, gentlemen, to follow a calling that more than any other directly and effectually supplies this first element of a worthy life—counting life's worth always by what it can accomplish. There are other kinds of manual toil indeed; and all such toil tends in some measure to the development of the body. But not all alike. Some of these call into exercise only certain portions of the body; hence their physical results are partial. Others, through their method or material, exert a counteracting, deleterious influence. Hence it is in some of the mechanical occupations that human life is the shortest. Thus from official documents of our own State, whose record runs through a period of nearly thirteen years, it appears that printers, machinists, painters, and tailors stand at the lowest average of life—the two former dying at thirty-six and thirty-seven, the two latter at forty-two years of age. The reason for this is evident, viz.: the indoor confinement and the inhalation of irritating or poisonous substances from the material of their work. At the head of the list, of which these occupations form the foot, stand the farmers, attaining the highest average, sixty-four years; going far towards doubling the life of the printer, living seven years longer than lawyer or minister, ten years longer than the doctor, and nearly thirteen years longer than

the blacksmith, whose avocation is usually referred to as especially illustrative of the beneficial effects of manual labor.

Such is the influence of the farmer's work on the physical life. It gives the longest lease of life. Of course it is equally productive of physical health and vigor.

That it has reached the limit of its power I do not believe. That the life of the Massachusetts farmer is capable of being yet more extended and physically invigorated, seems to me as clear as that the average length and enjoyment of human life at large are continually increasing under the more peaceful state and higher purposes of advancing civilization. Just as far as he is stimulated by a worthy ambition in his toil—an ambition that regards the toil only as the means to something higher, and therefore not a master to which he is to be enslaved, and by whom he is to be worked to the last point of endurance, but an helpful servant of his aims—will he find the physical benefits of that toil multiplied in himself. When he has learned, with clear judgment and good sense, to hit the golden mean between idleness and drudgery, then shall he realize not only a stronger power of endurance, but a greater energy of enterprise, from the calling he so wisely serves.

II. A second element of manhood is found in *mental activity*, the presence and the energy of *mind*. To this result farming may not lead quite as palpably, with as much directness, or in as great measure, as to the physical. But it more or less involves this, and may be made to promote it quite as effectually. It would hardly be possible, I think, even with him who has no higher aim than just to get his living from the soil, to succeed in his purpose without the occasional exercise of reflection, the necessary use of contrivance and plan. All this involves thought, the introduction of mind into his labor. Let him rise to a higher aim, that of enlarging and perfecting the results of his toil—improving the quality and increasing the quantity of his crops; let his be the ambition for excellence, superiority in his calling, and inevitably his thought must be as active as his labor. So much of mental activity, therefore, does his calling directly develop.

And here I say most distinctly and emphatically, that a true farmer is not only a working but a thinking man; he seeks to comprehend the principles of his occupation. He rises

above the simple practice of it as an art, to the study of it as a science. I know the sneering contempt sometimes cast upon scientific agriculture, book-farming, and all that. But I do not think you are here to-day to sympathize with that sneer. For you understand that science is, so to speak, but the reason of things. I hold, and you will agree with me in this, that the farmer should have a reason for the methods he pursues and be able distinctly and clearly to justify them thereby, as much as a mathematician should be able to show the explanation of the problem he solves. The difference between a practical and a scientific or thinking farmer is precisely the same as the difference between a school boy who "does his sum" after a certain way because the rule says so, and the scholar who not only knows *how* it is to be done, but can tell you *why* it is so done. The composition and capacity of soils, the constituents and demands of plants, the habits of bird and insect, the action of the elements, the qualities and treatment of the various kinds of stock, the best implements, methods, arrangements for planting, cultivating, harvesting, and preserving—these and numerous other points, which you can at once supply, open themselves to him who would be a successful farmer. The moment he undertakes to play a part worthy of his vocation, do all these subjects present themselves for him to inquire into, and from which he may gain knowledge, to guide him in his labor, and multiply and elevate its results. For such inquiry he must use all proffered helps, let him accept the services of every guide that is ready to clear the way before him. For him learned men, skilled in all the sciences have written; geologists, chemists, botanists, entomologists. For him men of means and leisure have experimented, and proclaimed the result of their experiments. Let him take the information thus given out, and with careful discrimination and wise judgment, apply it to his own purposes.

I have said so much of thought *in* your avocation that I can give but a word of thought *beyond* it. No man should ever allow himself to be shut up in his calling. No matter what his calling may be, it is too narrow for him to be confined in it. A world of other interests and other men are all about him. He should keep abreast of that world as it marches on. Its successive steps of progress in material ability and enjoyment, in

education, literature, arts, science, morals, politics, religion, all these he should mark. All this applies to the farmer just as much as to any other man. It is as much within his accomplishment. Nay, he has advantages for this which others do not possess. Many a quiet hour for reading and reflection may be had in his country retirement, which merchant and mechanic, in the excitement and rushing enterprise of town and city life, find it difficult to command.

Out of this mental activity comes a twofold result. First, it lightens the daily toil, makes it less a burden and a drudgery.

Man is so constituted as to require variety, exchange of labor. It is this which he needs quite as much as absolute repose. This passing from exercise of body to that of mind, and from field work, or domestic cares, to quiet thought and mental culture, not only brings its own direct results in knowledge and enjoyment, but reacts upon the daily labor, making it less a routine and a monotony, adding interest and infusing into it encouragement and hope.

The second effect of mental activity is to ennoble the labor with which it is connected. There is no dignity in mere toil. Nor is there any disgrace in it. Toil in itself alone has neither merit nor demerit. That comes of the spirit that actuates it, the ends it seeks. In other words, it is in the man, and not the work. The more manly qualities he carries into it, the more manly or noble will be his toil. Of these manly qualities, prominent is the one which we have been speaking, the presence of mind; a mind always open to all wisdom, able to appreciate, apt to employ it, prompt to turn that wisdom to its purposes, and persevering to press it to its last applications; a mind that precedes and penetrates and directs the labor, making it efficient, comprehensive, beneficent. Such are the workings and results of mental activity in your calling. And out of it flows social sympathy through your Agricultural Societies, and in many other channels to bless yourself and your neighbors.

III. There are three reasons why the tiller of the soil should be moved to cultivate social sympathy—why his avocation should develop it in him. First, is the freedom from competition attendant on his occupation. The amount of your returns does not depend upon that of your neighbor. That his fields yield abundantly does not a whit lessen the productiveness of your

own. Between your success and his there need be no clashing. Nay, in many ways you can assist and help each other. Second, is the fact that the products of your labor minister most directly to human life. For its continuance that life is dependent on your labors. Agriculture is the base and support of all industry, and therefore ought to be on friendly terms with all. In this feeling all engaged therein should individually participate. And third, is the beneficent relation which you hold to mankind. "He is a benefactor to his race who makes two blades of grass to grow where but one grew before." Whatever improvement you introduce, or progress you make, tending to increase the quantity, quality and variety of the fruits of the earth, is a direct enlargement of the comfort and enjoyment of your fellow men.

IV. But not only sympathy with humanity, but sympathy with nature, is to be cherished—that sympathy which shows itself in the *love and appreciation of the beautiful*, with which nature abounds. It has been perhaps a very common impression that the farmer has to do with uses, and not with beauty; and certainly in many cases that could have been, possibly can now be, found, the whole aspect of his farm, his neglected barns, his unpainted, unadorned dwelling, his coarse, uncultivated family, show too plainly that the farmer has discarded the beauty and left it entirely out of his plan of life. Yet there is no condition that has naturally such a complete envelopment of the beautiful as his. There is no man so continually met by it as he. No beauty in the farmer's life! Go through your exhibition halls and mark not alone the tinted flowers, but the ripened fruits, that have grown beneath your eye and the culture of your hand, and bid men match if they can in any other workmanship the external attractiveness which these present. The "fruit and flower pieces," on which artists of every grade devote their genius and their skill—of these you possess the originals. Landseer and Bonheur may *paint* animal life in its finished grace and strength; but your ploughing match, your cattle show, your trotting course, gives you not the imitation but the reality. They may attract admiring eyes with their picturesque and pleasing groupings on canvas; but the living group, which they but copy, it is yours to see every day. It seems to me that the farmer, above all other men, should

have the love of the beautiful developed in him, and that in all things pertaining to his life he should show that love; that neatness and order should preside over his farm, in all its arrangements, even to his cattle yard and pig pen; that taste should construct his dwelling and make it attractive without and within, adorning its grounds with flowers and its walls with works of art; that culture, refinement, personal graces, aye, the lady-like *accomplishments* of life, should add their attraction to the homelier merits of wife and daughter. Possibly, if the farmer's home were thus made more beautiful, its influence might be greater over the sons to keep them in their father's calling.

V. In all true Manhood is there a moral element also. It is this that gives *independence* and *integrity.* These are qualities which find in your sphere of life encouragement and help. The farmer is his own master. He has no party to serve. He is one of the sovereigns. He has no favors to ask; no offices, tariffs, bounties to beg. These things helping others, may indirectly help him. But he does not depend upon them. He need not sue and cringe, and debase himself for one of them. Nor are his interests at war with the higher elements of his being, his judgment, or his conscience. His work, the obtaining of a sure living through it, requires not the sacrifice or the subjection of these elements. Thus it is given to him, if he will, to maintain his individual freedom and to stand fast in his conscious integrity.

VI. The crowning element and finish of the true man is *religious faith*—a reverent recognition of God, of his presence and operations. "An undevout astronomer is mad." An unadoring farmer is a brute, fit only to herd with the cattle of his stall.

Such are some of the elements of manhood, the high end which every man's calling should serve; which your calling fosters and may more efficiently promote: physical vigor, mental activity, social sympathy, love of the beautiful, moral integrity, religious faith.

TASTE AND COMMON SENSE IN FARMING.

From an Address before the Middlesex South Agricultural Society, Sept. 22, 1858.

BY EMORY WASHBURN.

Every man seems to carry around with him a kind of moral thermometer, in the guise which he chooses to wear, by which other men instinctively settle the rank and place in the scale of humanity to which he should be assigned. In one man we detect at once the snug and careful husbandman. No matter if his garb is coarse, it is suitable and orderly, and in his person always clean and wholesome; he bears himself as if he had something in himself worth taking care of. In another, we see a man out at the elbows, slovenly in his habits, lounging in his gait, and repulsive in his address. It is not a difference in wealth, or education, or family, that makes the contrast, but something deeper and more essential.

Grant, if you please, that a man may be a good citizen and a kind neighbor and yet live with everything in a muss around him. But who ever went by such a man's door, without setting him down, if he did not know him, as a coarse and vulgar man, or a lazy and shiftless one?

On the other hand, no matter how humble may be its roof, or plain and unadorned its exterior, if one sees neatness and order around a farmer's dwelling, with a clean green yard in front, and it may be, a tree of his own planting in one corner, and a rose or a lilac in another, he goes to it in the assurance of meeting a civil welcome, and if he needs a kindness, that it will be cheerfully bestowed. And when was a civil man ever disappointed in asking a favor at the door of such a farm house?

If a man wants to see his own influence, and to know something of the power which every man unconsciously exercises,

let him try the experiment in his own farm. Let him expend a little taste in the matter of his fences, in planting now and then a shade tree, in clearing up old baulks of their brush, and giving up to his wife and daughters a corner of his garden, instead of planting it with cabbages and potatoes, and he will ere long see his own taste reflected in more than one of the farms in his neighborhood. Let me then insist, in the first place, that every farmer should cultivate habits of neatness and order in the management of his house, his garden, and his farm. It will not only make him a better citizen and a better neighbor, but a better and a happier man. And above all, it will make him a better husband and father. It chimes in with the natural taste for refinement and neatness of his wife and daughters. It tends to keep his sons at home by making the business of husbandry more attractive, and sheds over his home and his whole establishment the spirit of harmony and content which he would look for in vain outside of the magic circle within which he lives. Even in an economical point of view, this subject has an importance that one is too apt to overlook.

It is common with many to regard every thing ornamental in farming as something beyond their sphere—to be indulged in only by fancy farmers—whereas nothing is a greater mistake. In judging of the value of a farm, men look at its fitting up quite as much as upon the mere crops it can produce.

Let no man say that this may all be very well for those who can afford it, but that he has so much to do he cannot find the time or means for indulging in matters of taste and refinement. Not time! Can't afford! If he would only stop a moment, and reflect upon it, he would see that he could not afford not to do it. Suppose he should devote a spare half hour of a foggy morning, or a *lowery* afternoon, now and then, to breaking up for his fire the old wheels and broken carts and sleds that lie scattered about his premises, or in splitting up for use the knots and pieces of old logs in his door yard, or in raking up the dirt and chips which accumulate there, into piles for burning, or compost to lay around his trees,—suppose in this way, a sweet green turf should take the place of the rubbish, the burdocks, and the poison hemlock that gives such a sickly look and smell to the roadsides and door yards of so many farmers, and he should then offer his farm for sale in the mar-

ket, does any one doubt that he would get price enough additional to repay him for this expense an hundred fold?

Let him do more. Let him, in the early spring, or along during the autumn, now and then dig up and bring from his wood lot a graceful young elm, or ash, or maple, and plant it in front of his house, or by the road-side against his own lands, and after a few years, when nature shall have done the rest, and its branches shall have sprouted and spread, and it shall have put on its summer livery of green, and the birds come and sing and build their nests in its top, let him sit down in its shade and carefully count up its cost, and then ask himself if he would allow it to be cut down for the paltry sum he may have expended in the labor of rearing it? But I pass from being a neat and tasteful farmer, to the importance of being a common sense one.

In no department of the business of the country is this quality of sound common sense more needed than in that of husbandry. It is by no means opposed to what is called "book-farming," nor hostile to the theories and experiments of the fancy farmer. It furnishes the only sure test by which to try and see how many of these are worth pursuing.

Suppose we test it by the article of neat stock—one of the great and leading staples of husbandry in New England. The notions of men upon this subject have been, and still are, singularly unsettled. There have been treatises enough made upon Short Horns and Long Horns, about Durhams and Devons—Ayrshires and Alderneys—how one excels in flesh, another for draught, another for milk, another for all these combined—of the red color of the one, the light color of another, and the pied and parti-colored spots of the third, to confound the judgment of any ordinary man, and to have put old Jacob himself had he been obliged to listen to them, to doubting whether his ring-streaked and speckled flock were worth the trick they cost him.

Now no man can have all these races, and breeds, and varieties upon any one of our moderate sized farms. Amidst such conflicting testimony no one knows which to choose, and so the farmer either keeps on in his old way, or mixes a little of one new kind this year, and a little of another the next, till his stock is made up at last of good, bad, and indifferent, just where

he began. He trusted to breed and to blood, and laid aside his common sense, and nature fell back, as she always will do in matters of agriculture, to the point from which she started, where science and art fail to come to her aid.

The origin of the varieties in the races and breeds of domestic animals lies beyond the limits of our research. But it doubtless depends very much upon the accidental circumstances of soil, climate, and food, or on all these combined. And what is more remarkable, these accidental peculiarities and characteristics, however caused, are transmitted and perpetuated by descent from one generation to another. We see it in man as well as in animals of a lower grade. It was upon this hint that Bakewell, some one hundred and fifty years ago, conceived the notion of improving the English breeds of sheep and cattle. And it was by carrying out this idea into practical agriculture, that Colling and his coadjutors, at a later period, achieved a revolution in stock culture which has added untold millions to the wealth of England and the world. Now, that our own farmers might practise upon this hint, is too plain for argument.

But whoever hopes to bring up the character of our farm stock to the standard of that of England, by depending upon importation alone, mistakes, most obviously, the first element of success. Our climate is different, the food upon which they feed is different, and one might as well expect to change the thin, nervous, wiry Yankee race into the shape and phlegm of John Bull—who feeds on Smithfield beef and London porter—by now and then importing a family of Cockneys or burly Yorkshire-men, and feeding them upon poor coffee and half-baked hot rolls for breakfast, as to have a thorough-bred race of American animals, by any other means than improving such as have been acclimated here. So far, however, from this being a cause for discouragement, it furnishes a strong incentive to effort and exertion on the part of our stock-growers. The same physical laws of improvement in races, apply on this as on the other side of the Atlantic.

We have already a seemingly infinite variety of shades and mixtures of races and breeds of animals which have become hardy and acclimated. And who can doubt that by the same care in selecting from these for propagation, the same caution in respect to crosses, and the same regard for the health and

comfort of our animals in the matter of food and shelter which the stock growers of England employ, we should have breeds and races as valuable to us as theirs are to them?

The principle which I have been advocating, may be applied in a great variety of ways. It calls for habits of observation and discrimination on the part of the farmer, and rewards him while it furnishes sources of rational entertainment and amusement. Let him study the qualities of the soils of which his farm is composed, and ascertain, by reading, and inquiry, and cheap experiment, for what kinds of crops, or trees, or grasses they are best suited. He need not go to college nor to Germany to do this, nor study the hard names which profound chemists give to very homely, every-day things.

It is not a little singular, that in a matter involving so much science as that of agriculture, there should have been such an aversion to "book-learning" in the popular mind. We find it in nothing else. No man hesitates to ask the doctor what he may give his children for food, or what he may himself apply by the way of a restorative, when he feels poorly. But the idea of resorting to science to know what food he shall give to his springing crop, or what he shall do to restore the wasted energies of his once productive field, has been a standing subject for jeers and ridicule by what are called "practical" farmers.

It is, indeed, a modern discovery, that different plants require different kinds of food for their growth, and that these are to be sought in the soil in which they are planted, and the air by which they are surrounded. And that if the proper elements of the growth and perfection of a vegetable are not contained in the soil in which it is planted, it is worse than idle to attempt to force it to grow there.

And it is even a more modern triumph of science to be able, as the organic chemist will, to take a spadeful of earth from a man's field, and pick out and separate, and make palpable to the senses, the several ingredients of earth and alkalies, and salts and gases, of which it is composed, and to tell with as much certainty whether nature could, out of the compound before him, elaborate the clover leaf, or the flax fibre, or the wheat kernel, as you could tell whether you could spin a thread of cotton or wool from a handful of soft, white, fibrous sub-

stance which you may have taken from a bale which had no name inscribed upon it.

I am not proposing that every farmer should hire a chemist, or set up a laboratory upon his estate, in order to know what his soil will produce. He has got a cheaper and less fallible test in the seed that he sows. If the little capillary mouths and stomachs of the springing plants find food, and if it is there they will find it, they will grow. And if it is not there, they will starve and die. And no farmer needs a chemist to tell him this. The Priest in the story understood this, though he never read a page of Liebig's chemistry. When going his annual round to bless the fields of his parishioners with his prayers, he came to one whose crop seemed starved and poverty-struck, and he exclaimed at once, "this field don't want praying—it needs manuring." He knew that Providence does not waste its miracles upon the starveling crop of a shiftless farmer. And this brings me to my next topic, and that is the *economics* of farming.

It seems to me that the popular notions upon this subject must undergo a good deal of modification, if we ever expect to be a contented or independent community, or hope to save New England from being gradually depopulated of that class of practical farmers which has supplied so much of its best muscle and sinew. There is such a go ahead spirit at work among us, such an eagerness to better our condition in a moment, such a restlessness while we see any body better off than ourselves, that we rarely stop to examine whether we are really well off or not.

One of the hardest lessons which a young man has to learn is, not to despise the day of small things. One man goes out of a village to the city, and, by a fortunate run of good luck in trade, heaps up his thousands in a few years, and becomes the envy of all his country cousins and neighbors. Another takes his course to the West, and by a fortunate pitch upon some quarter section near a future county seat or embryo city, turns up, after a short time, a rich land-owner. And straightway, the whole village is ready to start for Boston or New York, or the Great West, in confident expectation that every body and any body can grow rich if they only could be in the right spot. They forget, or will not heed, the fate or experience of a score

of others who went to the same city, or spread themselves over the same West, from the same village, and have failed or have never been heard from. Ever since Noah saw the first bow in the cloud, men have been ready to start in a race for the pot of money which the legend has buried at its foot. And this universal passion of the race, seems to be especially intensified in every one that has a drop of Yankee blood in his veins.

But if any one would but stop and look around him, and see who are the independent men of our country, and how they became so, they would find that it was not by sudden and great gains, but by slow accumulations, by husbanding small means, by squaring one's expenses to his income, and laying the foundation for personal comfort and independence, little by little, as the oak grows into the monarch of the forest.

The truth is, the farmers of New England are far more independent than they are willing to confess even to themselves. They measure their condition by a false standard, and cheat themselves into being unhappy when there is no need of it. If you do not want a house as large as Solomon's Temple to live in, what is the use of contrasts with the one you have got, or what is just as unreasonable, why suffer your hearts to burn as you look upon the Elizabethan Castle that the carpenter has built for your neighbor.

Farming has always seemed to me to be like theories in political economy. You may take your slate and pencil, and sit down and cipher yourself into a good income, or no income at all—you can demonstrate beyond contradiction, that the country is going directly to ruin, by too high or too low a tariff, just according to the data you assume at the start. And yet in the face of these calculations, the country goes on prospering, and the farmer finds himself better off at the end of the year than at the beginning, though ruined, beyond retrieve, by figures which, as it is said, "do not lie."

The best way for a farmer, as it seems to me, to get what a sailor would call his "reckoning," would be to sit down some snowy day in the winter, after his crops are gathered, and his grain sold or ready for the market, his hired man paid off, his store account balanced, his taxes and his doctor's bill settled, and after setting aside enough to keep his children at school, pay the printer for his newspaper, which no good farmer can do

without, and purchase hoops and dresses for his wife and daughters, see how much he has got left to indorse upon his outstanding mortgage, or lend to a neighbor, or lay out to add a few acres to his farm. If he has enough for all these, and a little to spare, every year, he is richer than Rothschild, and is independent as the Czar of all the Russians.

But why should we test every thing by this vulgar standard of dollars and cents? Is there nothing in life for a farmer worth having but what he puts into his barn, or files away in his desk? Is there nothing in social position, in mental culture, in domestic comfort, in the education of his children, in the personal freedom and independence of spirit which none but the master of his own acres ever can feel? In all these I assert without fear of contradiction, and I wish I could make my voice heard in every farmer's house in our State,—that in no part of God's heritage does any class stand in a more favored condition than the farmers of Massachusetts.

I have no wish to flatter any one in what I say; and if we analyze the grounds on which I place this claim, far more is due to a wise form of government and a kind Providence, than the exertions of the individual man. Indeed, too many of them are unconscious of what their true condition is: and I would say a word upon this subject, not by the way of boasting, but to excite, if possible, feelings of satisfaction and contentment, and to keep our sons and daughters at home, to occupy the places of their fathers and mothers. We have, it may be, a hardy soil and a fickle climate; we may be obliged to work hard, and content ourselves with small crops; but the soil is our own, and there is health in our pure air, though it sometimes sweeps by us in the tempest. We have a market for our products at our doors, and we have laws that protect us in the enjoyment of those fruits of honest labor.

If it were not so costly an experiment, I would gladly see every New England farmer who feels restless and discontented when he hears of the wheat crops and corn fields of the prairie States, shut up his comfortable farm-house, take his wife and children and go to that promised land, and stay there long enough to contrast the two. I have not read the character for wisdom and shrewdness of the yeomanry of New England aright, or he would conclude, that, in the single life he has to live in

this world, he acts an unwise part who runs away from comforts, conveniences, institutions, safe highways, handy markets, schools, churches, and neighbors having a common history and a common tie of language, habits and associations, which it has cost a hundred years and untold sums of money to gather here, for the chance of finding a soil that can be easier ploughed, yield more bushels to the acre, or is worth more to speculate upon than these farms which the fathers of New England tilled in comfort and content, before the railroad and the canal had opened the forests and prairies of the West.

PROFITS OF FARMING.

From an Address before the Worcester South Agricultural Society, Sept. 29, 1858.

BY JOHN C. BARTLETT.

When we look about us, we find all our farming towns presenting a common aspect which is far from being agreeable. A constant exodus of our young men is in progress; sometimes the wave of emigration spreading itself over the western prairies, and again surging towards the gold mines of California and Australia; and when success in these points has failed, pouring itself through every avenue of business in the cities, but still ever flowing away from the old homesteads upon the green hills of New England, until we are lost in amazement at the vast number of young and earnest men who are thus fleeing from the quiet pursuits of agriculture as from a pestilence. And if we ask of them why they thus forsake the homes of their youth, we are told that farming offers little or no inducement in point of pecuniary profit.

But not only do the young prefer any other occupation to that of farming, but everywhere is the market glutted with farms, many of them the largest and best in their respective towns, the owners of which desire to change their business or to try their fortune elsewhere, because, in spite of figures which show great profits accruing on all crops raised upon the farm, they have found themselves gradually going behind hand in their pecuniary affairs. The main question to which I propose to ask your attention, is, whether there is really any foundation in fact, for the growing impression among the farmers, that their business is not as lucrative as other branches of industry carried on in the same town?

If a young man of good business capacity, enters upon farming at the age of twenty-one, having a farm valued at two

thousand dollars, paid for, but without wood or timber at his command to meet emergencies, the chances are greatly in favor of the supposition, that at the end of twenty years, he will have but little money invested in paying stocks; the increasing expenses of his family, and the essential improvements upon his farm, keeping him cramped in means to such an extent that his family must constantly resort to teaching or some variety of needle-work, in order to maintain a respectable appearance and position in the world.

On the other hand, if the same young man, instead of entering upon the business of farming, should stock a store with goods to the same amount of two thousand dollars, although he may get credit for the first investment, he would be found at the end of twenty years, with sufficient means to maintain his family in a respectable manner, and to educate his children in a more thorough manner than the farmer. The store-keeper doing a fair business in a farming town, and renewing his stock as his occasion requires, would, without doubt, be able to lay up a few hundred dollars each year, estimating his profits at what I am told is a fair rate, ten per cent. upon his investment. Let us now consider for a few moments the profits of the farmer, upon some of his most reliable crops, and the figures will show us that the comparative advantage is greatly in his favor.

The necessary outlay upon an acre of land planted with corn, estimating interest upon the value of the land, manured at the average market price and expenses of labor, and allowing the fodder to pay for the labor of harvesting, (which is placing far too low an estimate upon the value of the stover,) I suppose may be safely stated at thirty-five dollars. No farmer in an ordinary season, would be satisfied with less than forty-five bushels from his acre. Supposing its value per bushel to be eighty-seven and one-half cents, the result will be thirty-nine dollars, thirty-seven and one-half cents, giving a profit on the acre, of four dollars thirty-seven and one-half cents, or something over twelve per cent. on his investment. Carrying this acre onward to grass, and estimating the additional expense, including harvesting the grass crop for three years, at thirty-five dollars, and deducting nothing for the intermediate crop of grain, we may safely assume the yield of grass for three years, to be one ton per year, which, at an average value of fifteen

dollars per ton, gives us an annual return of fifteen dollars, while the annual expense or one-third of the outlay, will be eleven dollars and sixty-seven cents, a profit of three dollars thirty-three cents, equal to twenty-eight per cent. and a fraction upon the annual expenditure.

It would be useless to multiply calculations to show the profits of farming to be large in comparison to those of other branches of business in farming towns, and I have no doubt that these estimates which strike us so pleasantly in all our agricultural works and newspapers are in the main correct. Why is it, then, that we do not realize these results in the tangible form of cash? The truth is, that in every such problem there is a loss which is not always readily perceived, and the amount of which cannot be accurately determined. I mean the deterioration in the productiveness of every acre of land we cultivate, to such an extent, that we find it necessary to plough under our sod, the profit of this year, in order to enable our farms to yield a profit the next year. But I shall be told that the gain finally comes back in a cash form, through the sale of milk or of live stock. Let us then examine this point, and determine as far as possible, the cost of a quart of milk to the farmer. I know of no estimates of the expense of keeping a cow which appear to me to be more accurate than those kept at the State farm at Westborough; and I derive my data for this calculation from an experiment, the particulars of which may be found upon the two hundred and nineteenth page of the last Report of the Secretary of the Board of Agriculture. Assuming the average expense per day of keeping a milch cow from the first day of November to the first day of May, (during which period the cattle are usually housed,) to be as low as in the experiment referred to, viz.: twenty-five cents per day, we have a result of forty-six dollars and sixteen cents, for the winter keeping. The summer keeping, estimated at the low rate of six cents per day, from May first, to November first, gives us eleven dollars and four cents, to be added to the winter keeping, making the whole cost for a year to be fifty-seven dollars and twenty cents.

If we suppose the cows throughout the State, to give an average yield of six quarts of milk per day for nine months, which I think is a large allowance, and the average price paid to the farmer to be two and one-half cents per quart, we find

the income for milk to be forty dollars and ninety-five cents, leaving a balance of sixteen dollars and twenty-five cents against the farmer, to be made up by about two and one-half cords of unmixed manure which a cow will furnish in a year. Upon the same data, butter at twenty cents per pound will not return so large an amount of money as milk at two and one-half cents per quart, and I suppose the value of the skimmed milk will not very much exceed the increased value of the labor entailed upon the females of the farmer's household by the cares of the dairy. How many farmers can tell with any thing like reliable accuracy the expense of raising a calf during the first year of its life? Having for many years been accustomed to rear my own cattle, I have gradually settled down upon a system which experience has proved to result in the best growth and condition, and I know that a good yearling can rarely be afforded by the farmer, if he would secure a remunerating profit, at a less sum than twenty-three dollars. Yet taking the State through and including that nondescript variety which furnishes the barns of the vast majority of farmers under the title of native breeds, the average price of a yearling animal will fall very far below its cost. If we turn our attention to what are usually called permanent improvements, and mark the tasteful dwellings, the expensive walls and the fields cleared of rocks, it will too often be found that these have been only moths to eat up the surplus money which hard toil and rigid economy may have enabled the farmer to collect, and in the large majority of cases add no remunerating value to the farm in the market, but rarely fail to make their mark upon the books of the assessors, and thus make themselves pretty keenly felt in the increasing tax bills.

But if these avenues for draining off the profits which are so conspicuous upon paper really exist; if, indeed, the farmer toils thus in the dark, is there no process by which the profit may be realized in the tangible form of a banker's account, and investments in paying stocks? It is not to be supposed that under any circumstances, the farmers of New England can realize the princely fortunes which sometimes fall to the lot of the merchant in the city; nor, on the other hand, if he possesses ordinary industry and business talent, is he liable to fall into beggary as suddenly as the same merchant may do; but I believe that no

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man in the community has such facilities for attaining to that just medium which affords the truest source of man's happiness, "neither poverty nor riches," as the American farmer; for the evils to which I have alluded, and which are felt, if not understood by the great majority of farmers, are not inherent in agriculture, but have their origin in the loose manner in which the business of farming is generally conducted.

In order that any business may be successful, there must be a definite plan, the end of which must become a source of pecuniary income. Too many men enter upon the cultivation of the soil without any more clearly defined purpose than that they must raise a certain amount of corn, or roots, or grass, because all farmers have done so before them; and in this undefined purpose lies a great source of the limited profit which the farmer receives. The first question which should engage his attention should be this: "To what branch of farming is my soil, as a whole, best adapted?" When this point is settled in his mind, he should not be turned aside from his purpose, but should make every step in his operations bear upon that one result, persevering in this course diligently to the end. If he proposes to raise milk for the market, he must not be contented with *good* cows merely, but must furnish himself with those breeds only which have been proved to be the *best* and most reliable milkers, and his whole system of cultivation must have reference to furnishing those cattle with an abundance of such food as will produce the most generous yield of milk. It is to this oneness of purpose, that the increased profits of the English farmer, compared with our own, is to be attributed. Another important lesson which it is necessary for most of us to learn, is a more thorough division of labor. It is a great hindrance to the success of the farmer, that he must perform so many processes differing much in character, which, to be practised advantageously, must be thoroughly understood and performed in the best manner. But it is a far greater hindrance, that he mixes all these operations together, building a few rods of wall, and partially completing a drain, patching an old board or brush fence in his pasture, and commencing many other labors, some of which always fall short of completion.

The high cost and scarcity of labor compared with the same in Europe, will, of course, prevent the subdivision to the same

extent as there, where the man who mows the grass, or manages the plough, or digs the ditch, often understands no other branch of farm labor. But most of our New England farmers may learn that if they cannot afford to employ paid labor for each distinct branch of their art, they may accomplish much toward the same end, by finishing one operation which is to be permanent in its character before another is commenced; and since the outgoes for labor constitute one of the largest drains upon the farmer's income, it is essential to successful farming that none shall be wasted upon undertakings which are not pretty certain to pay a profit upon the investment. In order, however, to insure an economical employment of labor, two things are essentially necessary.

First, that the farmer perform as much of the labor himself as a proper regard to health and physical ability enable him to do, and that he should have a watchful personal supervision over all the operations carried on by the hired laborers, taking care that in all cases the result shall be that which he has planned rather than something uncertain in its character, resulting from the imperfect plans of the laborer himself.

I suppose that no class of farmers sink so much money annually, as those who, having accumulated wealth in other pursuits, enter upon agriculture as a source of amusement to which they give a slight personal attention for a few weeks in the year, leaving important improvements to be carried out by others who have no personal interest in their success. This would be of little consequence if farmers of smaller means did not too often from such examples commence changes in their own system, dazzled by a few large crops, without at the same time seeing their cost. The second point which I consider essential to the economical employment of labor is, that every farmer should so far keep an account of expenses, that he may be able to determine with tolerable accuracy the out-go and profit upon every crop raised upon his farm. I know that to many minds, this appears to be a gigantic undertaking. But a very few minutes, each evening after the labors of the day were finished, would suffice to enter all the important minutes in the farmer's book, to enable him to form an estimate which should be a very near approximation to correct results.

Indeed, I think that no stronger argument could be offered in favor of agriculture as a profitable business, than the fact that, notwithstanding the loose and indefinite manner in which it has been conducted, it has still sustained itself in full vigor, while if the same system had been adopted by the merchant, the mechanic, or the manufacturer, inevitable ruin must have ensued.

In concluding my remarks, let me urge upon the young persons who hear me, to remain upon the farm. You may not find the cultivation of the soil to open a vast mine of wealth, but you *will* find that method, industry and tolerable economy will give you a competence of this world's goods; that a contented and happy spirit will do much to check the growth of those moral weeds which become rank in the minds of those who "make haste to be rich." Thousands, who, but a few years since floated gently on the wave of commercial prosperity, now mourn bitterly over ruined fortunes, and often over ruined reputations, and when too late to go back, regret that they were drawn away from the farm by the dazzling brilliance of golden dreams.

Remember that while sudden destruction has come upon those who have engaged in the more artificial branches of business, the farmer has remained almost untouched and can still cultivate his land undisturbed by fears of want for the morrow. Put far away from you that miserable doctrine that there is any thing degrading, any thing to prevent you from rising in the world, connected with manual labor. If you would exert a commanding influence over others, cultivate your intellect, and seek to secure, by improving your spare minutes, a degree of knowledge which will raise you to the level of honorable labor.

If you would seek refinement of manners, first seek purity and refinement of thought; and never forget that with minds and hearts properly cultivated, the farmer in his ditch, or the farmer's wife in her dairy, may possess more entirely the characteristics of the true lady or the true gentleman, than any amount of wealth can give without them.

One more question remains to be briefly noticed. Is the young man who is about entering upon the business of farming, more likely to find profit in the new States of the West than in

New England? The chief inducements offered by the western lands, lie in the cheapness of the soil, and the light degree of labor required for its cultivation; and these are important considerations, by no means to be overlooked in connection with agriculture.

But as an offset to these, and entirely counterbalancing them, is to be considered the deprivation of the comforts of life to which every New England man has been accustomed from infancy; a deprivation, which submitted to in Massachusetts, would insure them a fortune at farming in a very few years. But after all that can be said of the easy condition of the western farmer as regards labor, it only amounts to a change of its character, a substitution of more ploughing for less hoeing; and the amount of crops per acre is not greatly increased, except for a few years, as may be clearly seen by reference to the United States census report for 1850, from which it appears that the crops of Massachusetts are quite as large per acre as in Illinois, Indiana, and Iowa. Besides these considerations, it must be remembered that the farmer of New England deals more directly with the consumer, and thus commands a fair price for his produce in the market, while the western farmer reaches the consumer only through middle men, who swallow all the profit, giving to the producer only starvation prices. I say, then, to the young farmer, while any unimproved land is to be found in Massachusetts, remain here; for where the largest amount of capital in proportion to the population is invested in active business, the best markets will be opened, and the largest profit can be realized; and no State in the Union exceeds our own in this particular, and within her boundaries you may by industry, good calculation, and tolerable economy, gather around you more of life's most valuable gifts, more for which to respect yourself and secure the respect of others, than in any other part of the world.

NEW ENGLAND FARMING.

From an Address before the Hampshire, Franklin and Hampden Agricultural Society, Oct. 14, 1858

BY GEORGE B. LORING.

Farming is by far the most important occupation in New England. In 1850 the whole number of farmers in the six States was one hundred and sixty-seven thousand six hundred and fifty-one. The number of acres improved was eleven millions one hundred and fifty thousand five hundred and fifty-four. The value of the farms was three hundred and eighty-two millions three hundred and forty-eight thousand five hundred and forty-three dollars. In Massachusetts alone, the number of farms was thirty-four thousand and fifty-nine. The number of acres improved was two millions one hundred and thirty-three thousand four hundred and thirty-six. The capital invested in agriculture was one hundred and nine millions seventy-six thousand three hundred and forty-nine dollars. In order to give you a comparative view of agriculture and manufactures, I would state that in the same year, in New England, the capital invested in manufactures was one hundred and fifty-eight millions one hundred and eighteen thousand one hundred and nine dollars, much less than half the value of the farms; and in Massachusetts it was eighty-three millions three hundred and fifty-seven thousand six hundred and forty-two dollars, about two-thirds of the value of the farms in our own State.

You will see by these figures, that while other occupations have built their monuments almost to the skies, while cities have started into life at the "stamp of their feet," while all that is gorgeous, and grand, and imposing, has been wrapt around them to make their greatness known to man, there is an unobtrusive branch of industry, which outweighs them all, both in material wealth and in those silent influences which are

felt everywhere, and which control mankind with calm and noiseless power.

This is the real and comparative value of New England farming. It may not have arrived at any great degree of perfection. It may be deficient in method and in the application of what are called scientific principles; it may have deteriorated for the last few years, as we are told by those who profess to know, but this is its true position upon which its prospects depend. A distinguished gentleman has informed us that from 1840 to 1850 the process of agriculture was "altogether a retrograde movement, and the lessening crop per acre, year by year, was so serious as to threaten the existence of the interest." And he goes on with figures to prove it. Now all this may be true. It is possible that the loss of land per year by exhausting culture in Massachusetts alone, amounted to one million five hundred and eighty-one thousand five hundred and seventy-two dollars, and that "the waste is equal to two and nine-tenths of one per cent. on the value of the farms." But this does not go to disprove the deep and vital interest our people feel in agriculture, nor to diminish its importance and influence. It may be true, as has been said elsewhere, that "New England does not produce the bread she eats, nor the raw materials of the fabric she wears;" and that a multitude of her agricultural towns are undergoing more or less rapidly, a process of depopulation. But the inference drawn from these statements, that New England agriculture is dying of a slow and consuming disease, is by no means true; neither is it true that farming here is on the decline, because the reality does not agree with the vague and rosy ideal which fills the mind of sentimentalists and dreamers.

The joys, and pleasures, and attractions of farming life are not measured by the amount of pinks and pansies which grow under the windows, nor by the amount of physical beauty inclosed within the domestic walls. The sorrows, and hardships, and depressing influences of agriculture do not arise from the necessity for constant labor which attends it. I will never allow that the farming population of New England is becoming "animalized" by devotion to its calling. Neither will I believe that the deep and innate sense of the true nature of this calling—that sentiment, unexpressed, perhaps inexpressible—that char-

acter making the farmer distinct, peculiar, individual—that instinct quickened by the business of the farm, by broad fields and the overarching sky, is lost here among our New England yeomanry. I cannot believe that "the farmer's life is no better than a street sweeper, if it rise no higher than the farmer's work;" for the farmer's work has a superiority in all its relations, a connection with the condition of mankind, a high estate in the scale of society, which no drudgery can depress. And I do not believe that the farmer is compelled to "apprehend that his farm has higher uses for him than those of feeding his person and his purse," in order to fulfil all his duties, and to keep himself up to the standard appointed to him in his social and civil relations. Whoever expects the business of farming in its details, in buying and selling, in planting, ploughing, reaping, digging, to be different from actual business in other branches, needs only a short life on a farm in order to discover his error. And whoever expects to drive the agricultural population of New England from the high position belonging to them by reflecting upon their daily toil, cannot comprehend the true genius of their occupation, nor the spirit of calm content and substantial virtue which belongs to a farming community. No degradation of labor has yet befallen us. And any analogy drawn between the rural population of New England, either in reference to their present condition or to their future possibilities, with the half-starved and squalid classes abroad, whom want, for generations has degraded, has yet to learn the first lesson in the study of New England character.

But when I hear it said, moreover, that in the farming homes of New England there is but one room in which the family live, spend their evenings, "and cook every thing for themselves and their hogs;" when I hear it said that the sons of our farmers flee from their homes because they are "unloved and unlovable things;" when I hear it said that our rural mothers are "mere bent and clumsy drudges;" when I hear it said that our farmers "are not men among men and women," that "socially, they become dead for years before they die," I am impatient to unfold the true picture of New England farming life for the instruction and admiration of those who know by daily experience its comforts and pleasures, and of those who carry in their

memories the cheerful associations of their childhood's home. For I know that in the rural population of New England there is always in every household a chosen spot adorned with appropriate taste. A few books upon the table, the mother's handiwork done in her girlhood, when she was a farmer's daughter, and before she had assumed the cares of a farmer's wife, hanging on the wall, the cherished pictures of those who have gone forth into active life, the substantial furniture which has known more than one generation, the musical instrument to whose keys the chords of the village psalmody are all familiar —these and more, make up the interior of our rural homes. Go with me, you who believe in the sketch of farming life which I have quoted, to the village church, and having learned there the appearance of the assembled worshippers, return with them to the domestic circles and know of what the families of our farmers are composed. You will find there, as in no other country, ample information upon the current topics of the day; an intelligent understanding of those doctrines which divide men into sects and parties; decorum, neatness, and almost universally a profusion of whatever is necessary for physical comfort and existence. In these homes a hardy race of sons tells of careful and hardy mothers. Witness the welcome extended to neighbors and friends, and judge whether the farmer there is unsocial. I can take you to a farmer's home on the very confines of New England civilization, where you may learn the best methods of practical agriculture, the choicest crops for the latitude, the last expedient of political aspirants, the latest pulpit controversy, and if your appetite is palled by a surfeit of city luxuries, you may restore its tone at the simple and well-filled board. I have been surprised to see how the New England farmer carries with him even to the very verge of the wilderness, that intelligence, and thrift, and skill, which in other countries cluster about cities and villages, and which mark him above all farmers on earth, as a free, enlightened, responsible citizen.

If New England agriculture is on the decline, as we are told, it is not because our farming population is ignorant, and unsocial, and "angular," and ungainly, and wanting in physical strength and energy. It is just the reverse. Our farming interests have been neglected because the intelligence, and

activity, and ambition, and force, and the good looks, moreover, of our people, have led them into enterprises of every description, which promise liberal and easy rewards. Our people are what is usually termed "smart;" the boys and girls are full of energy, and the parents behold with fond pride their children launching out into the busy world, peopling counting-rooms, pulpits, school-houses, factories, with quick-witted and busy occupants. I remember in early life, when I had just begun to look about me for occupation, when I had finished, as it is called, the education which my good father gave me, I started from my native village with my books and the horse and carriage with which I had been provided, to offer my services as a physician, to the sick and suffering in a town not far from Boston. It was a beautiful summer afternoon, and as I went on pondering upon my prospects, I overtook a boy barefooted, his bundle on his back, and his shoes in his hand, trudging on also in search of fortune. We were more than twenty miles from the great city, and I asked him to share my carriage with me on the journey. He said he had walked from the Penobscot River, was the oldest son of a farmer who had ten children, had heard that Franklin was a printer, and had left the old farm to enter upon that path to greatness, which he found had been traveled so successfully by that great patriot and philosopher. As we passed through the villages on the road, he informed me of their population and their industrial interests. He had read but few books, and these he knew almost by heart. His courage was great, and the only tear he had shed on all that long and weary journey, was that which he dropped as he turned upon the last "commanding hill" to look at his home with all its fond associations. I took him to Boston and introduced him to a printing office. He went his way and I went mine; and I have often thought that I might be at this day admiring the high position of this very boy, whose name I have long since forgotten. Do you suppose this boy left his home because it was distasteful to him, or the farm because he disliked it? Not so. But you may learn from this example why farming has periods of decline in New England. It is because the young men born on our farms are compelled to seek a living elsewhere, both by the limited pecuniary means of their fathers, and by their own ambition.

You must remember that few New England farmers are rich. The capital invested in their occupation is spread over a very large surface. They own their farms, and unlike the farming population of other countries, where serfs and peasants are rooted in the soil, and are transmitted as a part of landed possessions, they have the world open before them from which to choose, with the capacity and prospects of freemen. The greatest crop raised hitherto on these farms is a host of active, thriving, busy men, engaged in the professions, toiling in business, building up our cities and extending our commerce. And it is because the active capital of our community has been poured into other channels, that agriculture has been left to furnish that important product, which, while it sustains her associates, exhausts herself. Perhaps our fields have been exhausted, perhaps the average of our crops has decreased, perhaps our agriculture is on the decline; but, when we consider what our farms have done for us, what a robust and busy host they have sent abroad, to create home markets for the consumption of our products, we shall learn how by the law of compensation, agriculture will one day, if it has not done so already, reap the harvest she has prepared by her first sowing of bone and muscle, intelligence and activity, in the busy walks of life.

Yes, gentlemen, the intelligence, activity, and force of our people has led them away from agriculture, until of necessity the wave is beginning to return. New England farming is just coming out of a transition state. It was once almost the only occupation of our people, and so continued, until capital and industry were averted from it to manufactures and commerce, by whose operations we have been enriched and prepared for a new farming career, now, I think, just commencing. The fact that we do not produce enough to support our own population, simply proves that we have been able to employ ourselves more profitably than in competing with the cheap and easy agriculture of the newer States. And it is only when our population is forced back upon ourselves, and capital has reached its limits in other branches of trade, that our present system of common farming will cease, and high farming begin.

This era has already commenced. The markets which lie at our very doors, and furnish as safe and ready a sale for our products as can be found on earth, have developed all around our large cities, a system of agriculture, which is not easily surpassed in economy and appropriateness. The last quarter of a century has proved that a judicious investment in systematic and careful husbandry, with all the light which the science of agriculture can bestow, has received a reasonable and often highly liberal reward. Farming under such circumstances has proved itself to be profitable, and is, in consequence, becoming more and more attractive. An increasing variety in the demands of our markets, is constantly appealing to the ingenuity of our population. And that energy which in the early history of our country found its only opportunity in tilling the earth, producing a simple and prudent system of agriculture among us, has after long wandering in other spheres returned once more to the land.

Our fathers were good farmers. I can go with you to an early settled section of New England and admire the monuments of industry and skill which they left behind them. They had a remarkable genius for the selection of land. It was the source of their entire subsistence. In the clearing, the savage startled them at their ploughs. When the battles of freedom were to be fought, it was the furrows in their fields which sent forth their crop of armed men; it was farms which were deserted, not factories and mills. The chief trade of the times consisted in the interchange of farm products, or in their exchange for a scanty supply of imported articles of luxury and necessity. I say they were good farmers, for they farmed in accordance with the requirements of the times. They built heavy stone walls, they cleared large fields, they understood all the emergencies which might arise, they knew where to plant the dollar, in order that it might "return to them after many days." The houses and barns which they left behind them, and which literally grew up out of the soil, indicate thrift, prudence, and great skill in overcoming the many obstacles which lay all around them. Let no man suppose that this race of men is extinct. There is a space lying between the elaborate cultivation of our thickly peopled districts, and the still smoking forests of our new settlements, in which agriculture is

enjoying the profoundest repose. But beyond this space, in the outer circle of civilization, the primitive and successful career of our farming ancestors is at this day acted over again, with this difference, that now there are thousands of outlets for the surplus population—then there were none. Our New England corn fields are steadily encroaching upon the forests, and as they grow there in the shadow of those primeval woods, they yield a reward for the hard labor and small capital invested which is sure to result in competency and independence. On this territory there is a farming population, constantly increasing the number of acres brought under cultivation, and preparing the way for all the refinements of life, who compose one of the most active agents in developing our agriculture, and whose new fields supply the places of those that are neglected, useless and exhausted. It is this love of the virgin soil among us, which accounts for the increased acres of cultivation and the diminished products. And it is the occupation of this soil which constitutes a prominent feature in the great agricultural work going on around us. It has its merits. True, it is not the farming of a Hudson or a Mechi; but it is the conversion of hard and unceasing labor into a position of comfort and happiness; it is the work which bone and muscle can do towards the extension of education and refinement. It is a part of New England farming that is almost entirely overlooked, but which is that original and primitive agriculture begun by our fathers on the "spot where first they trod," brought by them to the perfection of rude productiveness, and carried in the vanguard of our advancing civilizations, "the ark of the covenant" for an enterprising and progressive people.

It is not therefore the high farming in the neighborhood of cities, nor the simple and rude agriculture of the frontier which requires attention, but that middle ground which the skill of the former has not reached, and from which the vigor of the latter has passed away. The question is, how to make the farming of all this great region profitable; how to restore it to its former prosperous condition; how to convert it into what it is designed to be, a flourishing agricultural district? It is idle to tell us that its prosperity has declined on account of bad cultivation. It is not meeting the matter at all to tell us that it is dying for the want of manure. Why is it not well culti-

vated? Why, are not earth, and sea, and sky, ransacked for manures by a busy crowd of farmers? Tell me not that the patient is dying "for want of breath." But tell me why he cannot breathe, and then we can apply the remedy. Let the farmers of New England but understand the method by which their farms can be made profitable, and the very air would be redolent with the odors of accumulating fertilizers. This is the sum and substance of the whole matter. Every farmer knows that he has only to ask, and he will receive from the bounteous earth herself an abundant supply of those materials which strengthen and enrich his soil. Let him but learn that it will pay to ask, and the whole difficulty will vanish at once. Let those who have relied upon the bounties of nature, which never fail, and who have learned to rely upon an indolent appeal to the soil for their animal subsistence, remember that in any other occupation than farming, starvation would crown such sleepy efforts, and they may then understand what would be the rewards of activity, industry and intelligent perseverance.

No man ever knew a busy farmer to grow poor. I never saw a skilful farmer who did not grow rich. And the secret of this skill is in understanding the capacity of the farm. Do you own five acres or five hundred—learn first what those acres are capable of doing for you, and you have opened the "golden gate" beyond which lie all the regions of wealth. The earth is a most willing servant, and be the crop a wagon load of esculents for the neighboring market, or the food of a thousand head of cattle, he that calls for this crop with a true understanding of how he is to call for it, and where he is to find it, is sure to receive his reward. Learn then, first of all, the capacity of your farm, and have faith to believe that it will never disappoint your reasonable expectations. Let this knowledge be diffused throughout New England, and the success of her farming is established at once. Learn this, and the science of agriculture becomes at once your ally, pointing to the whole inexhaustible supply of fertilizers lying at your feet. Comprehend this, and you will find the farm which occupies a township, as easily managed as that ten acre lot which your industrious neighbor has filled with the choicest products; for no farm was ever too large. The broader the area, the larger

the opportunity—always considering that he who depastures a wide expanse of land remote from his home, is as truly engaged in agriculture, as he who condenses all his operations within the limits of his homestead.

This adaptation of New England farming to every variety and size of farm-steading, constitutes its most important characteristic. There is nothing either in our tenure of property, or in the demands of our markets, or in our modes of cultivation, which prevents the small landholder from receiving his due proportion of the advantages of agriculture. It is impossible here for large estates to draw away the sustenance from small ones. You will hardly find this happy condition of equality anywhere else. Go to the West, and the prosperity of farming consists in holding large possessions which will furnish liberal contributions to the great staples of that region. Thousands of bushels of wheat, and herds of fat cattle, corn fields extending as far as the eye can reach, and pastures bounded only by the horizon, constitute the foundation of a western farmer's prosperity. Go to the South, and it is the owners of whole savannahs, who absorb all the agricultural resources of that section of the country, and produce by a necessary and inevitable monopoly, those commodities which enter into the commerce of the world. In these sections of our own country the small farmer has hardly a resting place for the sole of his foot. And if you will go with me to England, you will find that one of the most difficult problems now occupying the minds of the statesmen and philanthropists of that country, is the best method of advancing the prosperity of the moderate cultivators of the soil. After the most diligent and anxious investigations there, it has become a conviction in the minds of those who are interested in the matter, that only by combined capital in joint stock farming companies, can the great mass of small farmers ever hope to compete with the holders of large estates. As they now stand, there seems to be no other mode of relief for those hard working but unfortunate cultivators, whose position and capital are such as to prevent their competing with the concentration of power and wealth all around them. They are but tenants at the mercy of landlords, who have nothing to offer for the misery but their sympathies, and the stern decree which drives them from their estates, and of whom it has been

said that "they would be sorry to see the country parcelled out into a few large corn factories, and grieve to see the stout, honest tenants of many generations driven over the water. But they look at the fields dirty with weeds and ill-cultivated; at the farm-houses and buildings multiplied into hovels and ruins; at the arrears, numerous, if not large; and contrast these things unfavorably with the large clean fields, well-ordered premises, punctual payments, and thriving aspect of the five hundred acre districts. And reluctantly but firmly the agent's advice is followed, and another and another farm—another English household—is swallowed up by its neighbor."

How encouraging is the contrast to all this, presented by the farms of New England. It may be that our agriculture is neglected; it may be that our rural homes are deserted; it may be that our people have not yet learned the true value of their landed possessions; it may be that the activity, and vigor, and ambition of the young blood flowing in our veins, demands with feverish importunity a more exciting sphere of action than the farm affords; but the opportunity which an untramelled ownership of the soil, an unlimited possession of the rights and privileges of citizenship, a system of agriculture and trade in which a strong and industrious and skilful arm is all the capital required—the opportunity which these give, is worth more than all the attainments of science and all the accumulation of wealth, in developing the universal prosperity of a free and enlightened and industrious agricultural community. God deliver us from that distress which would drive our small farmers to seek relief and support in the complicated obligations of joint stock companies. I would preserve the sanctity of the household as one of the foundations of society. I would protect the smallest landed possession as the fountain of prudence, economy, contentment, virtue, and as the cherished spot on earth, within which the highest domestic happiness may find a home. The true genius of New England farming lies in this agricultural equality. Neither wealth nor ambition can furnish that power which will secure peculiar advantages to one farm over another. The mechanic who devotes himself to the implements of husbandry, labors here for the rich and the poor alike. We have no system of cultivation which is not open to all. There is the earth at our feet, and the broad expanse of sky

above us, whose blessings are offered with the bounty of nature, to the highest and the lowest, who "by patient continuance in well doing" deserve their reward.

We have a right to be proud of New England farming so long as this principle of freehold and this opportunity for small farmers lie at its foundation. It is this which made our fathers illustrious for their prudence, their energy and their success. It is this which has enabled our people to retain their tenure of the soil, while they have furnished the bone of their bone, the flesh of their flesh, for the advancement of society in all its various enterprises. It is this which has preserved our farms in their integrity, through a long season of necessary neglect, and now offers them to a community already prepared to return to the safe and peaceful pursuits of agriculture. And it is this which will forever continue our farming community in that substantial and commanding position maintained by those who founded our institutions with pious care, and preserved them through all trial with that heroism and devotion which are characteristic of the rural population.

But, gentlemen, this is not all. New England farming is no trifling matter. That hardness of the soil which has deterred so many from entering upon its cultivation, demands and develops the most reliable worldly virtues. It is only by economy, judgment, foresight, and diligence, that our farmers can hope to succeed. The earth here has no spontaneous productions ready at any hour to fall into the lap of an indolent and effeminate people. No hour, no day, no season, provides an opportunity for idleness. Our people must be intelligent, frugal, industrious, in order to preserve their very existence. When you look abroad over the community you will find that all our institutions of education and religion, our churches and common schools, are but the response to an imperative demand for intelligent Christian effort to preserve and elevate our social organization, and to enable us to discharge our duties as heirs of the faith and the farms of our fathers. We have sought for well-educated labor and have found it; and I can assure those who have not yet learned the true position of our farming, that no profession, no business on earth can boast of more industrious thought than is at this day devoted to the work of advancing the science of agriculture in New England, and of giving

a right direction to the practical labor of the farm. Whatever success we meet with is not the result of chance, it is not an accidental reward. It is that triumph which can only attend man's footsteps as the fruits of patient, intelligent and industrious toil.

Let us thank God, then, for our tenure of land, for our hard and rugged soil, for the capabilities of our agriculture, and for that necessity which rests upon us as the cultivators of New England, to exercise those virtues whch can alone preserve the great civil inheritance which has fallen to us as the sons of the farmers who landed at Plymouth and fought at Bunker Hill.

AGRICULTURE AND ITS RELATIONS TO AMERICAN INDUSTRY.

From an Address to the Hampshire Agricultural Society, Oct. 14, 1858.

BY NATHANIEL P. BANKS.

There are few States that can keep pace with the American people in the rapid increase of product and population. Their numerical increase is unexampled, and their industrial product is even more surprising than their increase in numbers. Every field of human enterprise and labor has been explored and exhausted, and when the last possible success, by known expedients, has been attained, inventive genius has enlarged the field of action, furnished new subjects and new objects, and added to the general result by substituting the limitless labor of machinery for that of persons. It is to this activity of mind and body, the unceasing transformation of material, and the necessary exchange of product and increased remuneration, that we are to look as the sources of national wealth and the prosperity of our people.

As we increase our capacity for labor, we extend the fields of enterprise;—stretch away from ocean to ocean, felling forests, building cities, erecting states, forming constitutions, constructing railways, tunneling mountains, excavating seas, creating new literatures and striking out new systems of education. As we glide along in this strange career, we attach foreign states to us by reciprocal treaties, and connect continents by submarine telegraphs. Our ambition is to possess the territory that immediately joins us, and to be right in the neighborhood of those that own the rest of the world, ready to buy or to sell at the slightest intimation that a reasonable chance for trade exists. We religiously comply with the scriptural injunction to replenish the earth, and not only increase our own numbers, but are not greatly alarmed by threatened depopu-

lation of other States. An eastern stage driver a short time since astonished an English earl who sought to confer an honor upon the Yankee whip, by making his journey with him on the box—"Hop on, squire," said the driver, "Hop on!" So we say to the nations, "Hop on:"—and we hardly debate the question whether they come to assist or to govern. A people whose existence a century since was unknown to three-fourths of the world, will, at the close of the present half century, number a hundred million inhabitants.

In this brief history there is nothing so marvellous as the extent, variety and increase of our industrial products. A commerce whose entire import and export trade with Great Britain, at the close of the revolutionary war, was less than twenty-two million dollars, now has a trade exceeding five hundred million, and has created, and finds employment for a tonnage equal to that of the British empire. The commerce of American lakes and rivers exceeds six hundred and fifty million dollars annually.

The augmentation of national wealth by manufacturing and mechanical industry is not less surprising. As in commerce there is no sea that is not vexed by the toils of our mariners, and no trade that is not stimulated by the enterprise of our merchants, so there is no avenue of employment or product in mechanic arts that is not subjected to the successful competition of our manufacturers. And we not only accomplish our purposes, but by new combinations of mechanical powers absolve the human frame from no small part of its former toil. The inventive genius of our countrymen seems to comprehend at a glance the purpose and method of successful and unsuccessful labor, and to provide new and royal means of accomplishing what has been done, or to do that which never before has been accomplished. From the pointing of a needle to the bending of a ship's knees, there would hardly seem to be a single demand for individual toil or the sluggish processes of nature, that some inventive mind did not propose to circumvent by the aid of machinery. Every department of human industry is alike its debtor. Commerce, manufactures and agriculture, through such instrumentality, have attained their present power, and cherish reasonable aspirations for new and enlarged spheres of action.

It is but a few years since its merits, for it makes no claims, were acknowledged at the world's industrial exhibition in London. At the first glance, the Crystal Palace presented nothing old, nothing that had been accomplished, in whatever perfection, that was not European. A second glance forced from unwilling juries and ungracious spectators the admission that there was nothing new that was not American. From ocean steamers to the pleasure yachts, there was nothing in navigation that equalled the American architecture. The wealth of John Bull was beyond his reach or power when under the key of an American locksmith, and never secure to him when under his own; and English authors, who, during the exhibition lamented that important agricultural machinery, in common use by the Roman farmers, had never been successfully constructed by modern artisans. Among the multifarious and new ideas embodied in the agricultural machinery of the American department, I had the pleasure of witnessing the successful operation of an American reaper; as precise, perfect and expeditious as any reaper described in Roman song or history. A similar success attended the exhibition of Paris in 1855, and American mechanics received the first and second premiums for reaping machines, the first award for sewing machines, the first for pianos, the first for skill in dentistry, the first for threshing machines, and honorable awards for other mechanical triumphs. Truly one might say that the goddess of invention was neither deaf to the prayers nor an uninterested observer of the patient vigils of the sons of this land of high destiny. In view of such results we might almost receive as true—as it is—the declaration of Macaulay, that genius is as much subject to the laws of supply and demand as cotton or flour, molasses or gin.

I trust I may be pardoned for this brief reference to the progress of the arts of our own day. It is to commemorate such advances in human knowledge, and especially when adapted to the promotion of success in agriculture, that this association of the devotees of American industry, was organized. It is for this that the citizens of this ancient county, among the most fertile and prosperous of the Commonwealth, have abandoned their peaceful vocations and pleasures, for a day of festivity united with improvement. It is by such gatherings that we

measure the steps that others have been making and ascertain our own position. Here we learn by personal communication the experience of others, and impart to them a knowledge of our own success or failure. Apart from scenes like those to-day presented to us we are not able to comprehend, much less to explain, the rapid advances in civilization that have given us a new name and fame abroad. In the isolation of home or in the limited association which village or town life affords, we hear with incredulous ears of reports of new achievements and novel experiments, but here the strength of a multitude, the power of association and union in which there is inspiration for all, forces upon us a knowledge both of means and results. Intelligent, enterprising and stalwart men, such as we have met on every side, could have accomplished no less.

The annual product of American industry, in periods of ordinary prosperity, is not less than four thousand million dollars. A thousand millions are paid in wages alone. A sum equal to the aggregate national debt of Great Britain is earned every year by those that constitute the industrial classes in the United States. Such an industrial product, regularly repeated every year, and increasing in the ratio of fifty per centum in every decennial period, is a fact never before recorded in the industrial history of nations. It suggests to us how deep an interest the American people have in the perpetuation of that peace with other nations which they now enjoy. It is a fact that, beyond the theories of mere speculators in political philosophy, stamps our government—self-regulated and cheaply administered, leaving its people with leisure and ability every year with their own heads and hands to create a national product equal to the accumulated debts of expensive governments and protracted wars of a century—as the wisest and happiest yet devised by man.

Of this industrial product, agriculture contributes by far the largest part. It is susceptible of demonstration that if any material sum be deducted from the gross amount stated as the aggregate industrial product of the American people, upon the ground of exorbitant estimates, it would leave to the agricultural interest an incontestible claim to the honor of contributing more than one-half the balance remaining whatever should be the sum. The census returns of 1850 exhibit a detailed agricul-

tural product of that year, which at the current prices was valued at one thousand three hundred and twenty-six millions of dollars, an increase upon the product of 1840 of at least five hundred millions, or nearly forty per centum. The same ratio for the eight years since 1850 would give us an agricultural product for the present year of nearly sixteen hundred millions of dollars. And this sum was the estimate Mr. De Bow of the census bureau placed upon the product of last year. But we cannot estimate the aggregate products of this year upon the ratio as to quantity or prices, of advances from 1840 to 1850. The increase is in far greater ratio. The occupation of the great agricultural states of Europe, in pursuits of death rather than life, and the panic produced among us by anticipated visions of short supplies and the startling reality of starvation prices, and especially by the frightful uncertainty attending pursuits of trade, have forced the attention of all—of consumers as well as producers—to the necessity of a more general field culture. To what extent has the aggregate product of agricultural industry been increased from such causes? How much of the seventeen millions of acres of improved but uncultivated lands of 1850 have been turned with the plough and enriched with seed for the first time, in the present year? In other words, how many acres have been added in 1858 to the improved as well as cultivated lands of 1850, whose upturned soil now for the first time drinks in the dews of heaven, reflects the sun's rays, and glistens with the golden autumnal grain? Who can say?

This is what agricultural industry contributes to the wealth of the country. A yearly contribution, a contribution in dollars and dimes merely, and not embracing an estimate of its physical strength, its capacity for endurance, or the love of labor and the moral power with which agricultural industry invests communities wherever it prevails. In this view we confine our consideration strictly to those who make field culture the business of life. Beyond this, how wide the influence which it exerts upon other pursuits. Whence do we derive the vigorous intellect of professional life that adorns society with its varied accomplishments, and protects individuals in the enjoyment of life, health, and their moral and personal rights? Whence comes that vigorous and exhaustless intellect that revels in

new channels of thought, and by new conceptions of power, or new combinations of old conceptions, creates the marvels—miracles almost—that fill the world of invention from day to day? Who supplies the successive races of men that, occupying for a brief hour an obscure spot upon the merchants' exchange in Boston, New York, Philadelphia, Paris and London, give to the world of finance and politics its law? Does professional society reproduce itself? Can inventive spirits call up their own successors? Have the mercantile centres of the world ever reproduced their own financial giants? Never! The farm supplies all. It is the salt of the earth, and if this earth's salt lose its savor, wherewith shall the earth be salted. The proportionate number engaged in the various employments of human life, justify the repeated calls of all professions upon the agricultural world for recruits. The rotation of crops is not more incessant, nor prolific, than its supplies of men. Of a population of five millions and four hundred thousand male persons over fifteen years of age employed in the various industrial pursuits in the United States, in 1850, two million and four hundred thousand, or forty-five per cent., were engaged in agriculture. Of thirty-five million of people in France, twenty million, or fifty-seven per cent., were in 1851, employed in agricultural pursuits. In England the proportion is not less.

Is it possible to state a higher claim to public consideration, for any one element of public life, than that it creates the bulk of national wealth, affords honorable and happy employment for one-half of the industrial classes, replenishes the intellect and genius of professional life, perpetuates the vigor and enterprise of the commercial world, provides physical sustenance for all classes, gives stability to the restless movements of other interests, and by its sober morality, chastens and subdues the fiery elements of a corrupting civilization?

And yet I do not greatly err, I suppose, in stating that one object, and that one a chief object, of the association that exhibits to-day so brilliant a share of the agricultural wealth and strength of the State, is to recall the public mind both to the necessity and profit of a more general attention to its demands. Everywhere we have heard the appeal sounded from the press, the pulpit, the halls of legislation and the public assembly. Something more than the apparition of gaunt hunger, that flits occasionally

by our disturbed vision, has impressed upon the public mind a fear that some of the great original interests of society are too much neglected.

The feverish return to field labor, suggested by the closely proximate want of the last year or two, by the appearance in our great cities of the Middle States of hunger assemblies and bread rioters, by the reference, at our tables, to the probability of sufficient supplies for ourselves, and the suppressed sigh for the thousands whose tables would bear little or none of that which supports life, does not satisfy us. The inquiry is repeated, Where are the young American men? What drives them from the homestead or the farm to the hazardous pursuits of speculation:—pursuits in which success is as a hundred to one; which shorten the period of individual existence, dwarf the physical proportions of our race, and shock us with the heartlessness of their conventionalities?

There are several suggestions upon this point that claim consideration. The most notable characteristic of the American people is their intellectual activity. It is inherited from their fathers. It is exhibited in every pursuit of life. It develops itself in literature, in commerce, in politics, in mechanics, in territorial expansion; and those circles in which intellectual life is most vivacious and vigorous, present the strongest claim to public favor. Have agriculturists opened a sufficient field for the exercise of this power? If they have not, it is a failure in the method rather than in the nature of their pursuit.

In other classes of business a process is adhered to only so long as it is superior to all others, and constant experiment subjects to constant tests its comparative efficiency and perfection. Is not tradition, on the other hand, adhered to as against experiment, in no inconsiderate part of the agricultural world? In other pursuits, the aid of machinery has been constantly invoked. Agriculture has, until the present generation, offered but slight, if any encouragement, to the proffered aid of mechanical powers. The chief ideas represented in the complex structure of modern agricultural machinery, have been known as existent powers for centuries, and many of them as instruments used in the days of Roman ground culture. The American reaper, that has lately startled the people of France, as a few years since it did England, with the perfection of its

work and movement, accomplishes no more than was effected by a machine in common use among the ancient Gauls, and described by Roman authors. The winnowing machine of modern times is based upon an idea borrowed from the machine invented by the Chinese for cleaning rice. Mr. Dickson, a standard author upon the husbandry of the ancients, says they used all the different ploughs now used in England. Harrows and cultivators are of equal antiquity with the plough. Both drill husbandry, which is now recognized as of great value in the economy of seed and manures, and the sowing machine, which is no more than a necessary corrollary of drill husbandry, were in common use among the farmers of China, Japan and Arabia. Guano has been known as a fertilizer for two hundred years. A late historian of the papal states declared that agricultural science has not been carried so high by the farmers in Scotland as by the Romans more than two thousand years ago. Even our cautious maxims about experiments are inculcated by ancient writers as strongly as by our own. It is not supposed that in this time no improvements have been made. We have not however improved upon the characteristics of Roman culture, which were system, accuracy and great vigilance against waste; but in results we have substituted a constant increase, for the diminished product of which their writers complain. And we are entirely relieved from that superstitious thraldom of mind that made agricultural projects dependent upon lunar and siderial influence, or required before sowing seed, that the hopper should be lined with the skin of a hyena.. It is not the fact that we are better employed and better paid, to which we invite attention, but that the machinery exhibited to us now as startling novelties, is in idea at least identical with that used in China, and Gaul, and Rome, thousands of years ago. Could mechanical aids—so important as we must admit these to be—have been so long excluded from manufactures or commerce had they been equally serviceable as in agriculture? Is it not clear that some discouragement has weighed against their admission in this branch of industry; something like an unreasonable adherence to the tradition of the past? Do we not see even now with what reluctance many intelligent farmers admit the possibility of improvement upon the old methods of husbandry?

The exclusive reliance of the farmer upon manual labor, excludes from his employ that class of men, especially young men, which finds intellectual occupation as necessary as bodily exercise; and this includes no small portion of the American family. However much we may chant the praise of labor, it is nevertheless true *that continued and severe physical toil is incompatible with mental culture or exertion.* Can we be surprised that young men should be attracted to those pursuits in which boidily fatigue is accompanied by intellectual excitement, rather than to that where mental action is extinguished by physical exhaustion? The substitution of mechanical labor in the heavy business of farming, will not only attract the attention of those who now fly from it, but it changes the character of the pursuit itself from that of drudgery to the dignity of a science. There is satisfactory employment for the most active mind in the analysis of soils, the study of the principles which regulate the phenomena of the atmosphere, through the operation of the barometer, the thermometer, the hygrometer and rain gauge; in tracing the laws of vegetable and animal life, and in the innumerable pursuits which make farming, when elevated to the dignity of an intellectual as well as laborious pursuit, the most solacing and satisfactory of all human employments.

Nor need we limit the aid of mechanical powers to that point we have attained. Other improvements will follow. A friend in whose ability I have confidence, stated that he had in contemplation a machine capable, with the aid of a single man, of sowing, harrowing and rolling ten acres of wheat in a single day. The steam plough at no distant day will usurp the place of the draft power, connected with the plough since the beginning of rural history. The substitution of liquid fertilizers for the present cumbersome and weighty manures, will perfect the economy commenced with the introduction of drill husbandry, and portable farm railways make even the heavy work of farming a pastime and pleasure. It is objected, I am aware, that these implements are beyond the means of small farmers. But the answer is that it is never necessary for a man of limited means to purchase an implement of doubtful utility. There are always other means of testing the value of new assistants; and in regard to the heavier and more expensive

machines, it will not be difficult by association, or hiring from those able to purchase, to realize all their benefits at a cheap rate.

Great aid can be rendered in this regard by the government. And I trust the day is not distant, when its clandestine aid to agricultural interests, through the inappropriate channel of the patent office, may be exchanged for an intelligent agricultural bureau, such as was suggested by Washington; when a national experimental farm, to test the virtue of seeds, and the merits of agricultural instruments, and to diffuse knowledge in the great science of land culture, may be established by the general government, at Mount Vernon or some other suitable spot.

They are rather social than pecuniary influences which attract our young men to the West. The average value of occupied land per acre in New England is not much greater than in the North-Western States, and far less than the average value in the Middle States. If we remember the proximity to markets, railways and navigation, it does not exceed the average value in the North-West. There must be, therefore, other reasons than those connected with cheap lands.

An important effect of this general change in the character of agricultural labor would be to bring its votaries more immediately in connection with public affairs and the government, to their mutual advantage. In the present condition of public affairs, I know nothing more truly to be desired, than that every citizen of whatever calling, should give them sufficient personal attention to be able to comprehend the exigencies of the country. This demands some degree of personal leisure, and some personal sacrifices. But it is indispensable. The great obstacle in the way of establishing popular government elsewhere, is the impossibility of securing popular attention. And if our own institutions fail, it will be from public indifference. I hail therefore every change which tends to strengthen opportunities for reflection and intelligent action as a public blessing; and more especially if it affect that great class of our people,—a majority of those actively engaged in industrial pursuits,—who, separated by their position from a thousand corrupting influences that circumvent others, recipients of pure air, healthful exercises, and satisfied desires, are the safe depositories of a nation's

highest trust, its lands:—I mean the farmers of the United States. To their ranks may we not now turn, as in other times, for such a man as the genius of Tennyson summons forth, as a right guide for the people of England:—

> "A man of heart, head hand,
> One of the simple great ones, gone
> Forever and ever by—
> A still strong hand in a blatant land,
> Whatever they call him, what care I,
> Aristocrat, democrat, autocrat,—one
> That can rule and dare not lie."

THE LAWS OF VEGETATION.

From an Address before the Hampden East Agricultural Society, Oct. 6, 1858.

BY OLIVER MARCY.

All material existence is divided into organic and inorganic, and the organic is again divided into vegetable and animal, so that one of the earliest attempts of the human mind at scientific classification gives us three kingdoms in nature,—the mineral, the vegetable, and the animal.

The mineral is affected by blind forces only, such as gravity, cohesion and affinity, and these affect every part alike. In the mass there is no differentiation of parts to contribute to the good of the united whole, but all parts are perfectly similar in structure and office, and the least particle repeated makes the whole mass.

In the vegetable, there is superadded a vital force which controls and modifies the blind forces of the mineral, and builds for itself an existence distinct from every other existence, whose parts differ from each other in structure and office, but mutually contribute to the sustentation of the whole. The spongioles, the root, the stem, the leaf are each distinct organs, and each performing different parts of the work, co-operate to build the organic vegetable from the inorganic mineral.

The animal is endowed with vital force also, and has added sensation and instinct; but though air and water in their unorganized state contribute to his welfare, yet he cannot live upon these alone; the mineral must be organized by the action of the organs of the vegetable before it can serve as food for the animal; so that the logical order of existence is, first, the mineral, then the vegetable, and last, and depending upon both the others, is the animal. Here then appears the important fact as a natural and logical necessity, as a part of the plan of God, that *all food for man and beast depends primarily and essentially upon vegetable growth.* And the corrollary is, that

the attention of the man who would improve agriculture, must in the first place, be directed to the cultivation of the plant.

It is a fact, that the luxuriance of the tropics, the original heavy woodlands stretching across our plains, flanking the hill-sides and shading the dells, the expanse of meadows covered with waving grass, the prairies expanding ocean-like, in one continuous vegetating turf, (though as we repeat them, they seem abundant,) afford only a precarious supply to savage beasts and savage men. Civilization cannot take a step without the cultivation of the plant, and the production in it of those changes which cultivation effects.

Low in the scale of civilized life as was the aboriginal American, he cultivated patches of maize, and beans and peas. Lazy, careless and improvident of the future as savages are, in most climes, they are compelled by the necessities of mere existence to cultivate the soil to supply those wants which the spontaneous productions will not supply. This necessity for cultivating the plant also exists in respect to those animals that accompany man, and upon whose existence his happiness very much depends. God has provided the plant for food wherever the animal could exist. The elephant and the rhinoceros luxuriate in the abundance of the tropics, and the reindeer paws his moss from beneath the snows; the herbivorous fish is provided with vegetable forage in the depths of the ocean, and insects feed upon vegetables in the boiling geysers; but if we would have the horse and the ox serviceable to us in the winter, when the green leaf is dead, and the fruit is fallen and covered with snow, we must cultivate and store away for them an abundance of their vegetable aliment. Would you change the lean, sinewy, bony, savage wild boar of the forest into that sleepy grunter—that roll of all delicious juices, and all tender meats and steaks—the Berkshire pig, you must stuff his stomach with cultivated vegetables; would you transform the spirited bucks of the mountains into the innocent doughfaces that nip the verdure of your hills in summer, and claim the protection of your sheds in winter,—would you clothe yourself with their beautiful fleece and regale yourself upon smoking mutton chops, you must cultivate for him the vegetable; would you eat the golden pippen instead of the acid and indigestible crab; would you press to your lips the blushing peach and suck its delicious

pulp instead of the original poisonous fruit of ancient Media, full of prussic acid; would you fill your cellars with potatoes and turnips, beets and cabbages, without which a farmer's dinner is impossible, you must cultivate the vegetable. Would you regale your eye with a hundred varieties of dahlias, roses, pinks and verbenas; would you have your cottage ensconced in trees, your lawns green and bordered by hedges, and your farm a picturesque landscape, you must cultivate the vegetable. Aye, what comfort does not come from the vegetable? The clothing we wear, the houses we live in, the winter fire we enjoy, the newspapers we read, the tobacco we smoke, the opium we revel in, the tea and coffee we infuse, the liquors we ferment, all come from the vegetable, and if there be any other good, if we cultivate the vegetable, we may sell and buy.

To know how to do this requires a most intimate knowledge of the anatomy of plants. For the farmer has not only to contend with the diseases of plants, as the physician does with the diseases of man, but he has to administer proper food; not only has he to produce a healthy, natural growth, but as in the cabbage, turnip, carrot and potato, to produce by his treatment a change in the character and habits.

The whole structure of the plant is very curious, complicated and interesting. In the root each one of the thousands of little radicles is terminated by a bundle (spongiole) of little hollow hairs, which operate like a sponge on the fluid that passes over them. This is the way the plant takes its food; it has no organs of locomotion by which to go and seek, no claws to catch, no teeth to tear in pieces and masticate; but the earth all around the stem is filled with spongioles, and when the showers fall upon the surface they dissolve the nutrient solids, and percolating downward are sucked into the organs of the plant. Many think that these little spongioles have an instinctive choice in the selection of food, taking up those solutions and those only which the plant needs. As a general statement it is true, that the same species of plants in different situations will contain—as found by analysis—the same ingredients in the same proportion; it is true, also, that when grown upon the same soil, the ashes of turnips will contain one twenty-fifth soda, while oats will have none. It is also true that when the root is cut off and the fresh cut surface inserted in any solution,

as blue vitriol, the solution is taken up into the stem; but we know not that any solutions injurious to the plant do enter into its circulation, unless like corrosive sublimate they first destroy the spongioles.

The labor of the cultivator is to be almost wholly expended on the root. The root and its relations should be his chief study. He can affect the plant but little in any other way. The winds of heaven laden with moisture, and which affect the leaf, blow as they have blown, and for field crops the cultivator has little control over them. Equally beyond his control are the gentle showers and the drenching rain. But the condition of the root is more completely in his hands; he can place proper ingredients for food around it in the soil; he can regulate the quantity of water by irrigating, ditching, subsoiling and hoeing. If the soil is too stiff to fit his plant, he can loosen it; if too light, he can supply clay till it suits him.

Water holding saline substances in solution, constitutes seventy, eighty and ninety per cent. of the green plant and may be dried out of it. It circulates through every part of it —in the stem, the root and the leaf. This circulating fluid answers the same purpose in the plant that the blood does in the animal, or the rivers and canals do in the body politic, to transport food from member to member. The root, the stem, the leaf are essentially composed of cells, round or square, or hexagonal in the softer parts, but in the firmer parts elongated into hollow fibrous tubes, closed at each end and beveled to each other. It is in these that all assimilation takes place, that the food is changed into the substance of the plant, that water and carbon are changed into gum, and sugar, and starch, and resin, and volatile oils, and organic acids; for Nature has a way, unknown to the chemist, of making all these substances, however different, from the same ingredients, water and charcoal. The plant grows by the multiplication and enlargement of these cells. At first they are a transparent vesicle or sac filled with fluid. In some, this fluid can be seen to circulate around the walls, up one side, down the other, bearing little particles of organized matter. The sap does not circulate in tubes as the blood does in animals, but it goes from cell to cell, passing through their membranaceous walls as liquids of different densities will circulate through a piece of bladder. As the sap

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passes on to the leaf, and especially in the leaf, the pure water finds means of escape and the remaining solution is concentrated and the dissolved earthy matter is deposited.

These cells multiply with great rapidity. In the mushroom, millions are formed in a single night, multitudes coming into existence in a second of time. In trees, a thick layer is formed each year between the wood and the bark, at first soft and filled with water, at length harder and containing earthy matter. The woody fibres always grow downwards, from the bud and the leaf among the other cells, and crowding them outward causes the stem to expand in diameter. Thus you have seen the branch or stem when bound by tendrils of the grape or by the bitter-sweet, (*selastrus secandeus*) expand above and grow over the ligature while it remained small below. In grafting, too, the woody fibres from the scion shoot down among the cells of the stock, and it grows on. But the bud or scion maintains its original character as distinct and perfect as if it had a root of its own, for in the multiplication of cells, each cell produces its like. The product of a bark cell is a bark cell, the product of woody fibre is woody fibre; the cells that secrete matter peculiar to the sweet apple never secrete matter peculiar to the sour. It is to the cell that we look for the integrity of species, and in it the unknown changes take place that produce varieties. The cell is the laboratory in which the whole character of the plant is wrought out. It is the seat of that invisible, immaterial something we call life. It is the primary element in all organic bodies. We can observe its phenomena, talk of the changes produced in its contents, but of the power that brings it into existence and superintends its wonderful operations we see, we know nothing.

How beautiful is the foliage of plants, the verdure of nature; the woody hills with their light green oaks and chestnut, and darker pines and hemlocks; the agitated aspen, the meads changing shade with the season, the crops of corn and oats, and rye, varying the landscape like a work of tapestry, the sombre screen thrown over our cottages in the summer noon; all these are grateful to our feelings. But while the leaf comes into the larger plan of human happiness, it is absolutely essential in the smaller sphere of the existence of the vegetable individual. One great function of the leaf is evaporation and

consequent condensation of the crude sap, a distillation by which pure water is removed and the contents dissolved in it concentrated. Its thin, expanded form, exposing a great surface to the action of the dry air and the rays of the sun favors this. A single sunflower has been known to throw off from its leaves two pounds of water in twelve hours. The supply, of course, comes from the spongioles. When the sun shines the most intensely and the atmosphere is dryest, evaporation is the most rapid, and if the supply from the root meet the demand from the leaf, all the operations of life in the plant are most intensely active. But if the supply from the root is not equal to the evaporation from the leaf, then the cells, no longer distended by fluid, collapse, the leaf wilts, and if it remain long in that condition, dies. To keep up the balance between the waste and supply, a curious regulator is introduced, in effect, though not in structure, like that placed upon the steam-engine to keep the machinery driven at a uniform rate. This arrangement consists of longitudinal openings (*stomata*) through the cuticle into the intercellular passages of the leaf. These openings are bounded on either side by an elongated cell made fast at each end; as the cell fills and expands and the distance between the two ends cannot be increased, it curves outward and opens the orifice and the water exudes rapidly, but when the cells are collapsed the curvature become less, the orifice is closed and evaporation ceases except through the cell walls. Very little evaporation takes place during the night, and you have noticed that the corn leaves which rolled up during the day expanded during the night by the continued activity of the root. In transplanting, when the radicals are broken off so that the proper supply of moisture is not taken up, the plant droops, and you cover the leaves to protect them from the evaporating force of the sun and air till new spongioles are grown and the root is in a condition to do its duty.

Another function of the leaf is to effect a chemical change in the sap as it passes through it. The green color of the leaf is due to a peculiar substance in its cells called chlorophyl, which in connection with sunlight, produces a decomposition and recomposition in the contents of the sap. I must be explicit here, for the knowledge is interesting and important. Every body knows that common charcoal exists *in* and can be obtained *from*

plants; that it is insoluble in water and even in the strongest acids or alkalies. How then came it in the plant which we have seen has no power of taking up substances in the solid state? Place your charcoal on the fire, and it mostly disappears. Is it annihilated? No. Man can destroy nothing. It has united with oxygen the vital part of the atmosphere, and formed an invisible gas, which in its behavior is wholly unlike either charcoal or atmosphere. It is not solid. Heat it and it will not burn; thrust a candle into it and the candle goes out; breathe it and it kills you. Chemists have called it carbonic acid. It is composed, by weight, of six parts charcoal and sixteen parts oxygen. From four to six parts in each ten thousand of the atmosphere is carbonic acid. The falling rain absorbs it, the spongioles take it up, it is transported to the leaf, and there comes in contact with the chlorophyl. When the sun shines upon it, the sixteen parts of oxygen are liberated, given back to the atmosphere, and the charcoal is combined with the water, making woody fibres. Immerse a growing plant in the water and place it in the sunshine, and you will see little bubbles rising from the leaves. Invert a tumbler over it—you may catch the bubbles as they rise. When the tumbler is full, place a candle in it and it burns with great brilliancy, breathe it and it is a tonic. It is not carbonic acid, it is pure oxygen.

The leaf also absorbs much carbonic acid directly from the air and some plants derive most of their carbon in that way. Place a growing plant under a receiver full of carbonic acid and common air; by and by it will be found that the carbonic acid has gone, and oxygen has taken its place.

Every fire that burns, every animal that breathes, sends out carbonic acid to feed the plant, and every plant is at work decomposing the gas and returning the pure oxygen to the air for the consumption of the animal. Deity has made these kingdoms complements of each other—parts of the united whole.

There is an element of food for the plant which deserves passing notice here. It is small in quantity but seems as essential to the plant as nails to the house. Its name is nitrogen. It exists only in the new cells, never in the old. It exists also in the gluten of wheat and in peas and beans. There is a little about each eye of the potato and in the germ of every seed.

New cells cannot be formed without it, and where it is present in considerable quantities, vegetable growth is stimulated to great rapidity. It is supplied to the soil by your barnyard manures, and in small quantities washed from the atmosphere by rain. All those fertilizers which have attained celebrity for producing rapid growths contain it in large proportions. But nitrogen and its compounds are not alone sufficient for the plant to live on any more than sugar will suffice for the only food of man. The other elements of vegetable tissues must be within the reach of the root and the leaf, or all the guano in the world cannot make the plant grow.

Let us look over a little and see what the plant is made of, how the elements are introduced, and what we can do to supply them. The most important is water. It is important not only because it is the agent by which the solid substances, potash, soda and silica are introduced into the plant, but because it is itself food for the plant, combining with carbon and forming most of its solid organic tissues. It consists of eight parts of oxygen to one of hydrogen, and in all the organic compounds of the vegetable, oxygen and hydrogen exist in the same proportion, and we therefore say they combine as water, or that water is not resolved into its elements in combination. Woody fibre when dry, contains, by weight, equal parts of carbon and water, seventy-two parts of the one and seventy-two parts of the other. Cane sugar contains seventy-two parts of carbon and ninety parts of water. Starch has the same composition.

The earthy ingredients are deposited in the cells and are necessary to the strength and growth of the stem and the perfection of the seed, fitting them for the food of animals and man. In every ton of red clover hay which you cut from the field, there are forty pounds of potash, eleven pounds of soda, fifty-six pounds of lime, eighty pounds of silica, nine pounds of oil of vitriol, thirteen pounds of phosphoric acid, and seven pounds of chlorine. In every ton of clover hay you cart from the field you cart away one hundred and fifty pounds of these mineral substances. And this is done year after year, not only in your hay, but in your corn, your oats, and your rye. Whence come these elements to supply the perpetual demand made upon them by the annual cropping? Do they exist in the soil in such quantities that they never become exhausted? I will

let the present condition of your soil, compared with what it once was, answer. I will let those old, forsaken, desolate, pine barrens of Virginia, once fertile, and the seat of productive baronial estates, answer. I will let you answer, as year by year you shovel and tug, and cart to your fields those very ingredients of the soil which your fathers carted off and dumped into the rivers.

Through the providence of God, water comes to you as to your fathers, in the showers of heaven, in the early and the latter rain. There is as much carbonic acid and nitrogen in the air now as then, but the decomposing organic matter, the remains of falling leaves and decaying herbs collected through untold ages, are gone. The soluble salts have been carted away and have not been returned. There is silica enough, but it is not in a soluble condition. There is potash enough but it is held fast in the feldspar of the granite and sand, and gravel, which are but slowly decomposed. Leach your ashes and take out the potash, and then apply them to these sandy soils, a large proportion of which is silica, and you will, perhaps, double the crop of corn, because the silica in the ashes is in a soluble state, ready to be taken up by the roots, and that in the soil is not. But unleached ashes are better, for they contain potash which is not only itself an element of vegetable food, but will unite with the silica in the soil, and render it soluble. Ashes are valuable fertilizers, but we advise you never to burn a plant for the sake of the ashes it produces, never to burn it to get it out of the way, if you can compost it and cause it to decompose. In burning a plant, the carbon is given off into the air and adds but a moiety to the whole whence it must be washed by the rain or absorbed by the leaves; but in the decomposition of the plant in the soil, all the elements of food are evolved around the root, and when there is a good supply, the plant takes it up in quantities limited only by the activity of its organs. One element in abundance is better than no fertilizing. The abundance of the one may stimulate the plant to uncommon energy in absorbing others not so abundant. But the plant grows best when all the elements of food are abundant. No animal will fatten while he must run to seek his food. We put the ox in the stall and the pig in the sty and help them to all they want.

On the same principle, and with the same care, we should treat the cabbage, the turnip and the beet. Burn your potato tops and pumpkin vines? No; raise crops on purpose to turn under the soil, without the smell of fire having passed over them. Your clover has spread its leaves to the wind, and taken in carbon and nitrogen; it has thrust it roots down into the subsoil and taken up the soluble salts which the other plants had not reached; it has organized these mineral elements, and when you turn it under the turf and plant your corn, the corn has abundance of nutriment ready prepared for its use. Wherever you can get a crop of clover you may get a crop of corn. If you have nothing but a sand bank, put on guano or something to make your seed catch and stimulate the plant, and every thing that is in the soil, and in the air, and in the rain, will be brought into the crop. Turn it in, and you have lost nothing but gained much. *Now* a crop of grain will grow without guano. But cart off the green crops and you have lost the few essential materials which the plant extracted under stimulus. Even that powerful stimulant, guano, cannot produce a crop after a few repetitions.

It is a "penny wise and pound foolish" policy that cannot afford to turn in the green crop when it is grown, and will end like all such policies, in bankruptcy—bankruptcy of the soil, and bankruptcy of the purse. I know of no so obvious and valuable means of fertilizing worn out or naturally barren lands, which the people in this vicinity so much neglect, as the turning in of green crops. Nature always proceeds in this way, why should not we? Throw up the barren subsoil to the surface, the spores of lichens floating in the air lodge upon it, the plant springs up and lives upon air and water, it throws out its spores in a circle around its position and dies, bequeathing the organized matter to the barren soil. In this centre the seeds of grasses which demand organic matter in the soil, spring up and grow, and around, the new spores also spring up to enlarge the circle of fertility, and this continues till the barren clay and sand is covered with a handsome green turf. The old, worn out tobacco lands of Virginia are being completely renovated by green crops. Thousands of acres that were once fertile estates have been for years covered with old land pines. They were desolate, barren, of little value. It was found that

guano would produce clover, and the clover turned in would produce wheat and corn, and now abundant crops wave where once the breeze sighed in the stinted pines. We know many good farmers in the state of New York, who rely wholly upon plaster and clover for their corn crops. You may save your green crops if you have peat. But where is the farmer who uses peat when he has it? I see only here and there a man who esteems it properly; we almost always hear it said "it is cold stuff." Such persons are in the same error with the man who drinks ardent spirits and thinks excitement as good as strength. Look at Northampton meadows in early spring and your crops are ahead of theirs. Crops there depend more upon the soil, and not so much upon manure. Go again in August and the meadow crops are ahead of yours. These crops are like two children; the one has brains and nerves in excess and not much stomach, blood, or muscle; he learns quick, hates work, and don't care about play; but if he lives, he has matured at twenty-five or thirty, knows all he will know, has accomplished his reputation; he fails any longer to come up to expectation; he is as great a man as he ever will be. The other has a less active brain, though perhaps as much of it; he has more blood and muscle; he eats, works, plays, sleeps and grows. After expectation has been disappointed in the first, *he* begins to astonish folks; he arrives at his full ripeness only after the other man is dead, but his harvest of learning, strength, and manly wisdom is more abundant. Your crops, with only stimulating fertilizers, like the first boy, have no organic basis on which the activity can be continued for a great length of time; but the crop in the meadow throws its thick roots deep into the soil, where there is abundance of the real aliment of the plant, and when the sun comes to the solstice, his energy upon the leaf is answered by the vigorous energy of the root, and the crop grows fastest when your stimulated plant has exhausted all its resources. Potatoes have been stimulated to death. The potato rot, whether it be an insect or a fungus, or some internal organic disposition to decay, is, we believe, due to artificial, stimulating fertilizers. The best potatoes we have seen this year, the cleanest, fairest, the most free from rot, the most perfect every way, were raised on sandy soil, upon which nothing but peat has been placed for several years.

THE SOCIAL AND CIVIL POSITION OF THE FARMER.

From an Address before the Franklin Agricultural Society, Oct. 6, 1858.

BY GEORGE B. LORING.

It seems hardly necessary that I should remind you that the first step man takes is in the art of tilling the soil. His physical wants make a farmer of him, with a necessity as irrevocable as the decrees of the primal curse. His progress from this condition to the construction of buildings for his comfort, of tools for his convenience, and of articles of luxury and use by which he becomes the mechanic and the manufacturer, and his advancement to that state in which he exchanges his products and establishes the commerce of the world with all its civilizing influences, must be familiar to all your thoughts. But if you go still further you will see how agriculture gives tone and quality to a nation and to its institutions. Aside from that necessity which compels man to appeal to the earth for subsistence, there is that attachment to the soil which, once established, can never be broken up. It is the strength of this attachment which rouses so many substantial virtues into active operation, for the protection of our possessions. Prudence, economy, judgment, sagacity, that honesty which is the best policy, are all exercised by him who has by hard toil secured the possession of land, or who is called upon to preserve and cultivate his ancestral acres. Careful forethought becomes his daily habit. He feels the high importance of a moral and intelligent community to his safety and happiness. The responsibilities of his situation mature and dignify his thoughts, and call upon him to sustain those institutions of education and religion, without which society would fall into a hideous and dangerous anarchy. As a farmer he has daily cause to recognize the

power of an overruling Providence, and his tendency is towards a religious sense of gratitude; he is obliged to study the operations of nature, and his perceptions become acute; he knows the protection which he receives from his country, and he becomes loyal; he is by the very accident of his birth attached to the spot of his nativity, and he becomes one of that permanent population which receives the proud title of yeomanry. Now it is not alone that this man occupies the position from which society begins, but he also preserves that ground upon which society rests. He is constantly building up what other occupations are tearing down. The toil and depression of associated life in cities, the weary confinement of the mechanic arts and manufactures, the destruction of the seas, are all making draughts upon human life which agriculture is called upon to supply. In the heated and restless existence of workshops and mills, passions are engendered which are always at war upon those safe and reliable characteristics found in the rural population. Against all that enervates, undermines and demoralizes society, agriculture offers the protection of undying vigor, rugged intelligence, and stern and sagacious virtues. A community of successful farmers understand the value of education—they must have school-houses. They know the high worth of morality and religion—they build churches. The hum of the busy town reaches their ears, and they hear that all around the great palaces of manufacturing wealth, poverty and ignorance and crime cluster in horrid groups, and agriculture stretches forth her hand to feed the hungry and clothe the naked, pouring forth her harvests to enrich a country, and to enable it to protect its poor, and educate its ignorant. Do you wonder then that England sets so high a value upon her agricultural interests? She knows too well whence comes those qualities which make her a great people. Society there, as well as in our own country, recognizes its true foundation, and however high it may rise, however brilliant may be the elegance and refinement of life, however elevated it may become in thought, however pure it may be in life, amidst the dreams of poets, and the designs of the ambitious, it always receives new vigor and new life from contact with its great mother.

Do not understand me to say that the characteristics which agriculture develops are all high and noble and useful. Like

all other occupations it is liable to perversion. The conservative virtues which belong to it, and which establish the confidence mankind feel in it, may be converted into the hardest and most immovable defects. Still it retains its social position, furnishing mankind food, supplying muscles for labor in the various arts, creating and employing the mechanic and the manufacturer, and cultivating man to a height of physical and moral excellence which supplies the raw material out of which the leaders of our race are created. Do you doubt this? Go with me to the pulpit and learn how large a proportion of the talent there displayed had its origin in the farming population. Enter the bar, and you will find the sons of farmers there exercising the intellectual and physical strength imparted to them in their youth on the farms of their fathers. Look around the forum, and the greatest statesmen there long to return once more to the acres where their growing powers were moulded,—to the rural life whence they inherited the natural powers which lie at the foundation of their success. Learn from these men the first lesson which they teach—that agriculture literally gives birth to society, and recuperates it with unceasing bounty. And learn moreover, as has been justly said, that "it would be no difficult task, it would require no special pleading, no ingenious tricks of argument, to prove that all human knowledge, science, art, culture and skill, with some of the richest means of happiness, have come directly to man through the tillage of the earth."

Agriculture lies not only at the foundation of the most substantial social virtues, but also at the foundation of the most substantial social prosperity. In our own country it is the prevailing occupation of a free, industrious and thriving people, impatient to grow rich. Three-fifths of the population of the United States rely upon it for their subsistence, and derive from it all the means they enjoy of obtaining moral and intellectual culture. Two millions four hundred thousand of our able-bodied citizens labor on the soil; and they hold in their hands three-fifths of the whole wealth of our country, pouring annually more than a thousand millions of dollars into the store-houses of the nation. And how steadily and surely this great occupation goes on! To the millions devoted to it, financial crises are unknown. While the ardor of ambition and the flush

of hope, and the impulse of self-confidence, and the love of chance, and the excitement of trade, gather a restless and uneasy crowd into the market place and the exchange, where fortune smiles upon the few, as the great mass pass from the glowing morning of their early aspirations and promises, down to the gloomy night of disappointment and ruin, the constant and even prosperity of agriculture blesses all its faithful followers according to their deserts. It is no game of hazard. Its rewards are not large—but its independence is great. There is an even-handed justice in its dispensations, which scatters its favors with an equal hand, and relieves mankind of poverty on the one hand, and of the burdens of excessive wealth on the other. The world has learned to envy the rich and the powerful, through an indiscriminate admiration of every kind of success. But if you would learn where the most independent happiness and prosperity are to be found, go with me to that farming pioneer who makes himself a home where necessity compels him to clear his own farm, feed and clothe and educate his own family, until he becomes one of a community of farmers like himself, safely removed from the toils and temptations of what is called a prosperous world. He may be deprived of some of the elegances and refinements of life, but he loses none of his manhood, none of his robust self-reliance, none of his strong and rugged individuality; and if you desire to estimate his influence upon his day and generation, you may remember that from such a father and from such a farm sprang the great statesman of New England, whose wisdom is the glory of the American people, whose love of the soil is the pride of American agriculture, and whose high career stands as a monument to the name of Webster, and to the farm at Franklin, as enduring as that Constitution and that Union to which he devoted his mighty powers.

In assigning this high social position to agriculture, I by no means desire to disparage commerce, manufactures, and the mechanic arts. I only wish to give them their proper places. I recognize their vast benefits to the interests of agriculture. I am not unmindful of the stimulus they have given our calling by improving our implements of husbandry, and by creating markets at home, and opening those abroad for the consumption of our products. I estimate the full value of this compensation

which our manufacturing and commercial towns render to the rural population, in return for the drafts they make upon its moral, physical and intellectual strength. I am dealing only with their relative positions. And when I consider how powerless all other interests would become before the wasting effects of a famine, how instantly a broken and bankrupt trading community turns to agriculture for the means of relief, and sees a ray of hope gleaming upon the country from bounteous harvests, I am more than ever confirmed in my respect for the parent of all social and civil enterprise. Storms may sweep our seas, fire may consume our mills, bankruptcy may walk our streets, but so long as the floods and drought, are stayed from our farms, so long as seed time and harvest continue on the earth, society will rest upon a foundation which no convulsions can destroy.

It is indeed true that mankind in all ages have given this position to agriculture. The oldest nations of the earth, whose annals run back to the Mosaic account of the creation, have not only supported a teeming population from the soil, but they have preserved an isolated political integrity which nothing can shake. It was Syria in the days of Abraham, and Egypt in the days of the Ptolemies, that as agricultural countries increased in wealth and population. It is agriculture which has alone fed the Chinese nation for centuries, and has enabled that peculiar people to preserve unmolested its manners and customs against the constant and eager attempts of outside barbarians. No wonder then that mankind has an instinctive attachment to this occupation. The poet, from the days ot Hesiod down to our own time, has sung his sweetest and most joyous song, inspired by the daily associations which attend the path of the farmer. Speak but of the voices of nature which surround him,—of the dewy stillness of the morning, of the first soft whispering of spring, of the echoing call of his cattle among the hills, of the busy hum of harvest, of the mysterious midnight wind, of the wild raging and still repose of winter, of the beauties of field and forest, and all man's nature responds with quick, instinctive impulse. The words that are uttered tell of all that is most dear to him, of all that he has one day enjoyed, or of all that he hopes to possess before he is called from his place on earth. In this respect agriculture has no

parallel. The music of the mill has not yet been sung in strains that have an irresistible charm. The sad and sorrowful lines of the "Song of the Shirt," and of the "corn-law rhymer" are about all that belong to the poetry of in-door toil. The deafening noise of machinery, and the heat of the crowded shop, however much they have done for the prosperity of mankind, have never risen above the level of a useful and important trial. No man turns to them for relief from higher and harder cares. He whose exhausted brain seeks comfort and repose from the toils of busy life, whose energies have been wasted in the incessant strife of the forum or the pulpit, the bar or the market-place, does not return to the work bench or the last for the exhilaration he so much needs. Oh, no! His thoughts run back to green fields, to the silence of the country, to the sights and sounds of agriculture. He finds there his sure relief. Is he fortunate in business? As he finds himself on the down hill of life and thinks of its close, he buys a farm and hopes to die there. Is he unfortunate in business? He rakes together the remnants of his broken fortune, and settles down upon a farm. Has he been tossed all his life on the stormy sea? He looks about him to find the repose of country life. Let his occupation be what it may, he hopes to own one day land enough to establish his claim to the earth, and in the peaceful retreat of which he can prepare himself for heaven. It is nature, liberal, bounteous, benign, inexhaustible, responsive, divine, which has appointed agriculture as her handmaid, and has given her power to impart vigor to man for his active social duties, and to receive him into her calm embrace when the curtain falls and the great drama of his existence is brought to a close.

From the consideration of the social position of agriculture, I now pass to its relation to the state. In obedience to the divine law which called us into being the generations of men come and go, man lives his appointed time, all latitudes, all races, all states, all occupations become one under the universal law of birth, maturity and decay. Not so, however, with nations. Empires rise and fall, dynasty follows dynasty, monarchies and republics succeed each other in rapid revolution, the exceeding glory of to-day becomes clouded to-morrow, where once the arts of peace prevailed, the horrors of anarchy and misrule may now yawn

like a bottomless chasm, the warm and vigorous health we now behold may ere long be quenched by "the pestilence which walketh in darkness, and by the destruction which wasteth at noon day." In all this strange and exciting history it appears that not to race alone, but chiefly to the occupation of its people, are the real greatness and perpetuity of a nation to be ascribed. Tyre and Athens, and Palmyra were great, but they were as evanescent in their national existence, as the meteor that shoots across the evening sky. Venice grew up into the majestic proportions of a republic, gorgeous, commanding, powerful on sea and on land, the queen of the Adriatic, controlling almost the commerce of the world; but her people have returned to their original huts upon the lagunes, and her pride crumbles and moulders along her once royal canals. Holland struck an early blow for freedom, but the accidents of trade proved to be a poor foundation for a republic, and her freedom sunk with her ships. Within their narrow and crowded limits these nations compressed all that was brilliant, all that was refined, and elegant, and fearless; they wore for a time the most glittering jewels in the crown of their nationality; the monuments which they erected stood upon the foundations of wealth, and education, and energy, and dazzling success. Commerce and manufactures poured into their laps unbounded treasures. And in establishing their institutions they seemed to vie with the defiant mountains, which point to the eternal heavens, unmindful of decay or change. But the enervating effects of those luxuries which the excessive accumulations of wealth always bring, the debasing influences of trade, the physical disability which comes upon a crowded population, the shifting and uncertain chances of commerce, the absence of a permanent and immovable national bond, were the fatal inheritance which reduced these nations to decay, or destroyed that freedom for which they had devoted all their energies. They either accepted a tyrant or were despoiled by an invader, because their estimate of their privileges was based upon their power to trade, and because their palaces and storehouses were easily plundered and destroyed. The elements of character, the tenacity of purpose, which belong to a rural population, had no seat in the market places of these gorgeous and ephemeral civil organizations.

Turn now with me to another picture. Egypt has resigned her wonders of art and architecture, to conquering hosts and to destroying time, but not her fertile valleys, nor her groaning sakias; not her farmers nor her crops of corn, as abundant now as when the sons of Jacob found there relief for famine. India has borne for centuries the exhaustion of ruthless plunder, but her nationality is as strong and her wealth as great to-day, all along her luxuriant hillsides and valleys, cultivated with pious care, as when Clive first entered her palaces and displayed to the simple and astonished Hindoo, the religion and morality of Christian England. Hordes of Mongols and Manchus have overrun China, in vain, for her people have learned by agriculture, her boundless resources, and have taken root upon her soil. And in more modern times, England and France have been torn by revolutions, exhausted by wars, but never shaken in their identity, because in each, in different forms, the possession of the land has formed the distinctive feature of its political existence.

And we shall find this to be true in all permanent forms of government. It is the ownership of the soil which establishes the individuality of every nation. And as has been truly said by one of our most acute and learned statesmen: "Whatever be the political name of a government, it is monarchical in spirit and fact, if the land be held chiefly or in great part by the sovereign, as in Egypt, Russia, or India; it is aristocratic, if it be held in large estates, by individuals, as in Great Britain or Hungary; it is democratic if it be extensively distributed among the people for cultivation, as in France or the United States."

It is agriculture, therefore, which lies at the foundation of all civil organization. It not only designates the form of government under which men live, but it supplies those social qualities to which I have referred as the solid support of all human institutions, and presents them as her choicest tribute to the state. It is her wealth which constitutes the material prosperity of a nation. A thousand millions of dollars are drawn annually from the soil of the United States—and even here in Massachusetts, the produce of our thirty-four thousand farms is worth more than all the results of the millions of busy spindles which call into existence those thriving cities

peopling the banks of our rivers from the Connecticut to the Merrimack.

To look no farther for illustration, it is land which has made these United States a permanent, prosperous, and thriving people. Our tenure of land gives a distinctive character to our government; our fortunate geographical location and our agricultural resources give it a firm and unshaken foundation. It is not our lineage alone which makes us great; for here in the early settlement of our country the Puritan, the Cavalier, the Huguenot, combined to plant along our shores from Maine to Florida, those principles of freedom which are inherent in all breasts, and which found new opportunity for growth in the amplitude of a virgin soil. In our own day, under the equalizing influences of our government the Teuton and Celt alike rise to the elevation of free citizenship. For all possess the land. It would seem to be a part of our national destiny, to bring every kindred, and nation, and tongue under heaven into the full understanding and enjoyment of a free government. It is the abundance of land here which has infused into the national mind a desire to possess, and which scattered our people in our early days from the shores of the Atlantic to the slopes of the Alleghanies, and inspired them to dislodge all previous occupants, with relentless determination. And as the natural consequence of such an origin, we have proceeded to occupy and improve a belt of land across this continent, whose extent and resources cannot be considered without wonder and admiration.

Had our people swarmed along the Atlantic coast, and become the carriers of the products of others, and the manufacturers of their raw material, our colonial existence might have continued to this day. It was the untamed and untamable spirit cultivated by the occupation of new soil, and by the promises held out by an untrodden wilderness, which gave us a national existence, and national characteristics. The gradual progress of our emigration along the valleys of the Mohawk and the Susquehanna, along the great chain of lakes and through the delicious lands watered by the Ohio and its tributaries, opened to us a country which constantly furnished new and vigorous materials for the foundation of our republic. We indeed possess "a goodly land and large." And as from time

to time in our history, our people have gone forth to occupy it, the power and vitality of a great agricultural nation above all others that dwell on the face of the earth, have been exemplified.

I cannot sufficiently admire the relation which exists between our own frontier States, and those original members of our confederation, from which they derived their birth. Those broad and fertile lands receive the restless and uneasy surplus which accumulates in a crowded community; and clothing it with all the obligations and all the attachments of property, return it to our common nation, in all the dignity of a sovereign State. Nothing has served to bind us together in one grand and imposing confederation, so much as the spirit which animates our new States. The jealousies of conflicting interests are unknown to them. The demands of commerce and manufactures for the fostering care of government and the strife for ascendency in the receipt of favors, cannot reach them. It is agriculture which develops their resources, gives them a common bond with the sisterhood of States, and which step by step raises them above the deprivations of frontier life, into the accomplishments and comforts of an older social organization. They are constantly imparting their new vigor to the States from which they sprung. To them the manufacturer looks for his surest market. They stand with open hands to receive what commerce brings to our doors. They impart that power to our nation, which has roused a spirit of invention before unknown and unheard of, and has whitened every sea with our sails, until our flag tells every where the story of our freedom. The floating palaces which navigate our rivers have come into existence at their bidding, and on to the very verge of a savage country they have borne our arts and attainments, and the unclouded glories of our national success.

The world has seen nothing like this before or elsewhere. Rome colonized in early days. England colonizes in our own time. But neither Rome nor England ever discovered the power which agriculture possesses to enlarge a nation, when submitted to the equality of free citizenship. The Romans possessed an expansibilty and an energy equal to our own. England knows no obstacles in the way of her advancing jurisdiction. But to us alone it remained to enjoy the happy opportunity contained in the possession of a continuous territory,

broad enough for daily peaceful victories over an unsubdued wilderness. The Roman emperors, the statesmen and generals of that great empire, were proud to develop the agriculture of their country by devoted application. They learned to love the soil on which rested their power and glory. But the American citizen, engaged in a higher and nobler work, carries with him into new lands the rights of a freeman, and by his devotion to agriculture, insures a constant supply of new strength to the heart of a great nation. As we contemplate the work of this modern hero, we should learn to admire and wonder at the power of his profession. We should never forget that the wealth which is added to our nation by the energies of the West, comes from those vast regions where man's chiefest occupation is tilling the soil. The rich luxuriant lands of Ohio, the fertile prairies which send forth their stores of grain, the undeveloped resources of the north-west, the profusion of southern savannas, offering us the great staples of our trade, all rely upon the application of agriculture for the discharge of their important duties, and for the support they are eager to render the civil fabric erected by our fathers on this continent.

To us, as a free people, agriculture should be peculiarly dear. It is this alone, which, under the management of a general ownership of the soil, can destroy those social distinctions that conflict with all true republican institutions. That poverty which produces a dependence of one class upon another, and which is the inevitable result of population accumulated by manufactures and commerce, can find no remedy so sure as the occupancy of the soil. A large supply of fertile lands, open for possession by all, will most effectually counteract the tendency to poverty, found in over peopled countries, and will prevent the possibility of that preponderance of commercial and manufacturing interests, which will always threaten the existence of a nation. In such landed possessions, moreover, serfdom must be unknown. And upon such a basis alone can that diffusion of knowledge, that freedom of religion, that indiscriminate security of political rights, be found which constitute all that an American citizen holds dear, and which are inscribed in our written constitution.

NATIONAL INDUSTRY, THE TRUE SOURCE OF NATIONAL GREATNESS.

From an Address before the Norfolk Agricultural Society, Sept. 29, 1858.

BY JOHN S. ELDRIDGE.

Man's moral and intellectual greatness consists rather in what he is capable of becoming, than what he really is. Hence he is under that "law of progress," which so vividly marks his career through all ages and nations, and which God seems to have stamped upon his being. Physical laws of climate may control some of his peculiarities, may create some idyosyncracies, and direct some of his tendencies, but without the active force of another law, which is that of labor, man would remain in his normal condition. Progress, then, is the compensatory reward of labor; and just in proportion to the directness, intensity and intelligence of that labor, will all progress become intrinsically valuable to society, and priceless to the individual. Therefore we deduce the truth that labor is the great primary law of man's nature, underlying and paramount to the law of progress. Hence labor is no curse, but one of the divinest blessings, and every effort to get rid of honest industry is a violation of our integrity to the law of God, and we become his unfaithful representatives on the earth.

"There is," says Carlyle, "a perennial nobleness and even sacredness in work. Were he never so benighted, forgetful of his high calling, there is always hope in a man that actually and earnestly works; in idleness alone is there perpetual despair." By work, I do not mean mere manual labor only, but every effort of the mind as well as of the body. I embrace all men in that great brotherhood of laborers; he who plies the shuttle at Lowell, works the steel at Sheffield, stands swart and grim amidst the fiery forges at Pittsburg, or whose scythe sings in the falling grass. These are not one jot the better laborers than

a Kane, penetrating those Arctic realms, on his errand of mercy, and planting his country's flag on the topmost hill that overlooks that great unknown northern sea; than Wellington at Waterloo, or Napoleon at Austerlitz, or Washington in mid-winter crossing the Delaware, or our own Fisher, transferring nature to his canvass, or a Thorwaldsen, or a Greenough, carving the solid marble into imperial life, or Milton, with a throbbing brain, defending English liberty, or Humboldt crossing seas and mountains to unfold the laws of nature, or Herschel with optic glass in hand, at high midnight, sweeping those southern skies amid revolving constellations. These one and all belong to the fraternity of industry.

Man was created to labor. Without it, constituted as Adam was, he would have grown weary of the perfections of Paradise, and in idleness alone there would have been despair. All growth of character, all noble energy, all true manhood, are the result of work. In what are called the higher classes, men born to wealth and rank, you can rarely find a large, well-proportioned character, nicely balanced in the equities of health, strength, moral force and intellectual capacity.

Where, in all England, in this nineteenth century, has there been seen so strong and self-reliant a nature, so robust in those elements which go to make up one grand central character in his country's history, as George Stephenson, the mechanic and railway engineer? There can be no clearer illustration of the truth of the doctrine, that in all labor there is a "perennial nobleness," and that the true nobility of a country is the untitled nobility of labor. The decaying castes, ranks, and orders in European society, have relied for their perpetuity upon fresh accessions of blood and vigor, from the great middling interests of the nations; and they know but too well, that, without this, an idle and dissolute race, or body, cannot long hold the sovereign sway of empire against the clear heads and stout arms of millions of laborers.

You all remember when the Duke of Grafton reproached Lord Thurlow with his plebeian origin, that the noble Lord vindicated his claim to his position, by the strenuous industry which had placed him there, and hurled back the taunt that the peerage "solicited him, not he the peerage."

Labor becomes, then, all ranks and conditions of men. There can be no respectability without it. Let us, then, in whatsoever pursuit we may be engaged, strive to dignify it by honest, manly and straight-forward industry. The aims of the laborer should be high and noble, and his daily duties should be set round with the Christian virtues; his work should not be for selfish and mercenary purposes only, to gratify a foolish pride, to stimulate envy, or pander to a false ambition, but it should be performed in that spirit which will exalt, rather than debase his character, which will elevate the hopes and aspirations of mankind.

Labor should be hopeful. No matter what obstacles stand in his way, no matter how many difficulties it has to contend with, by patience, which Buffon says is genius, they may be overcome; and in one such triumph, how much strength is gained, how much renewed moral courage impels the hand and the brain, after such a victory. Said Dessaix at the battle of Marengo, when the French columns were wavering and breaking, "Sire, I think this is a battle lost." "Sir," said Napoleon, "I think this is a battle won!" and in an hour after, the eagles of France flew to victory.

Despair often whispers to the overworn and wearied sons of toil, "your life is a battle lost," but hope comes with her celestial garments, in the darkest hours of trial, of danger, and temptation, and breathes in heavenly accents, the immortal words, "your life is a battle won."

All labor should be intelligent. It has grown to be a maxim, that always near the hearing ear will be found the speaking voice. We may with justice assert, that allied to the working hand should be found the trained and educated brain. The means of education should be open and accessible to all; and if individual means or interest fail, the state should provide for the establishment of schools and institutions suitable for the instruction of every individual in the elements of knowledge. No child should be suffered to grow to manhood in a free, Christian commonwealth, without a sound and healthful culture, fitted by his training for any one of the departments of industry known to a high order of civilization. These institutions, having all the rigorous forms of discipline with perhaps less elaborate study of the sciences than the Academy of France, or

our own National Academy, at West Point, would give us such a nation of laborers as the world never saw before.

The idea that labor need not be intelligent, that it works better by being debased to the condition of brute force, is a relic of barbarism, and forms no part of that code of modern philosophy which seeks to elevate labor and dignify and Christianize the laborer.

All great improvements in modern science, in the arts of commerce, manufactures, or agriculture, have been achieved by having an intelligent mind to impel the willing hand. One hundred and fifty years ago there were but three coaches in Paris. Now railways thread their courses over mountains and along valleys, and forty-three thousand people ask as a kind of popular right for free passes to attend the festivities consequent upon the visit of the Queen of England to the Emperor of France, at Cherbourg, and nineteen millions of passengers ride over the railways of France in a single year.

Intelligence aids the power or faculty of invention. England to-day maintains her maritime, commercial and manufacturing ascendency by virtue of her intelligence. The Celtic labor of Ireland she employs to dig her canals, construct her railways, and after this work is done, she ejects this surplus power and population to Australia, or America, and keeps straightway on her path of duty. She introduces none of her arts of industry into Ireland. She confines her to agriculture as far as possible. It was intelligence which was the creator of the wonderful labor-saving machinery now in operation, the spinning jenny, steam-engine, and power loom, together with all the untold inventions of the age.

All labor should be well-directed. It should be given to the production of those common and daily wants of life so requisite to the happiness of man,—to the cultivation of the soil, to the manufacture of needful articles for domestic use, so cheap that comfort can be diffused through all classes of society, for the general good rather than superfluous luxuries for the few. That was a homely wish of the Fourth Henry of France, that he hoped to see the day when every peasant in the kingdom could have a fowl in his pot on Sunday.

From individual labor we now turn to view the wider and more varied theatre of the race, as exhibited in National Indus-

try. The early history of the origin and progress of nations discloses to us most important truths touching the condition and employment of the human race. The first advance beyond the normal condition consists in the domestication of animals, or maintaining large flocks and herds, wandering by day over vast plains, pitching their rude tents nightly beneath Egyptian skies, or encamping round about the hills of Palestine. This seems to have been the employment of the nomadic tribes of the oriental world. From this state of society the race instinctively tends to the agricultural, because it lies in what may be called the spontaneous course of events.

The first example in the history of the world of a well-ordered national industry is that of England. This small island, set apart from the great continents, standing alone in the open sea, performs the most conspicuous part in the magnificent drama of the world. With a territory containing only about 50,000 square miles, or little more than 37,000,000 imperial acres, with a home population of less than seventeen millions, it holds the first rank in wealth, in maritime strength, in moral force, and that intellectuality which rules the nations of the earth. Her present superiority is the result of a well-directed industry in agriculture, in commerce and manufactures.

In the United States all labor is respectable; in idleness there is disgrace. The early settlers of this country inured themselves to the hardships and privations attendent upon the colonization of a new and uncultivated domain. They came hither to enjoy those inestimable blessings of civil and religious liberty, which were not to be obtained in the parent country.

And when they settled in New England, they secured an interest in the soil, which was ultimately to ripen into that permanent ownership, without which the present form of government would never have been established. The colonies held the lands by virtue of charters granted by the crown, and notwithstanding great efforts were made by individuals to obtain patents of large tracts of territory, thereby creating landed proprietaries of immense power, yet the simple mode of subdividing estates prevailed in the northern colonies, and remains the same; and in all the free States of the Union has proved to be the great safeguard of the rights of the laborer.

The area of the United States, at the peace of 1783, was 820,000 square miles; by various treaties and purchases the

area is 2,963,666 square miles, and is now ten times as large as Great Britain and France combined. In 1856 the products of the United States were immense. By the official returns at the Patent Office we learn that the crop of Indian corn for that year was $360,000,000; the wheat was valued at $247,500,000; the hay $160,000,000; the cotton crop $136,000,000. To these add the animal and vegetable products, and we have five times as much more in money value to add to the sums enumerated. The United States has five times as many acres in cultivation as England, and if the same skill were used, we could support five times the population which we now do, without resorting to any more wild lands.

Agriculture is the important branch of our national industry, and hence we maintain its importance in its relations to the great ideas of freedom, of republican government, to universal education, and to the principles of science. Institutions for the study of agricultural sciences should be established in every State in our Union. The public mind must be awakened on this subject. Europe has schools and colleges for the education of young men, who are to devote themselves to the practical duties of farming. Why overlook the subject in America?

Agriculture, when practised as an art, is an honorable pursuit. When pursued as a science, it is an ennobling profession. The Earl of Carlisle, in addressing an agricultural gathering of Yorkshiremen, said, with evident emotions of exulting patriotism: "I saw on the plains of Troy the clod-crusher of Crosskill, the drills and the horse-hoes of Garrett, and the ploughs of Howard and Ransome."

From the shops of America issues every implement of an improved husbandry. The skill and genius of the mechanics of New England may be seen on the sands of Egypt and along the grain-growing shores of the Baltic; on the tilled fields of England; down the great delta of the Mississippi, and the table-lands of Mexico. Wherever commerce unfurls her wings of peace, there we send the products of our toil.

As men of intelligence, the active merchant or overwrought statesman, retire from the duties of life, how often they return to the favorite pursuits of their youth. Washington laid down the cares of State for the quiet shades of Mount Vernon. Jefferson lies at Monticello! Jackson sleeps at the Hermitage.

Clay reposes at Ashland. Calhoun always delighted in the beauties of his own mountain home, and around his grave flower the gentle magnolias planted by his own hand. We who have hearts can never forget when our own great statesman went down by that sea which he loved so well, and there amidst his own fields, fragrant with the breath of departing summer, with his patient herds grazing around him—as the great barons die—on the soil endeared by sweetest memories of life, health, ambition, "cares of state," of a future eternal in the heavens, —so he died, and the ocean chants the requiem, through changing seasons, over the grave of the statesman and farmer of Marshfield.

Said Washington, in his message to Congress in 1796: "It will not be doubted that, with reference either to individual or national welfare, agriculture is of primary importance. Institutions for promoting it grow up, supported by the public purse, and to what object can it be dedicated with greater propriety?"

Among other resolutions, John Adams offered the following, in the Congress of 1776: "Resolved, That it be recommended to the Assemblies, Conventions, and Councils of Safety, that they take the earliest measures for erecting in each and every colony a Society for the Encouragement of Agriculture."

The practical mind of Franklin early foresaw the benefits of teaching agricultural science in a collegiate course. Writing to a friend, in 1749, he says: "I am pleased with your mentioning agriculture as one of the sciences to be taught, because I am of opinion it may be made as much a science as any of those that are not purely mathematical; and none of them deserves so much to be taught as this, at least none more so, since it is truly the foundation of wealth and welfare of the country."

Said Mr. Jefferson, speaking of this subject: "The class principally is that of agriculture. It is the first in utility, and ought to be the first in respect. It is a science of the very first order. In every college and university, a professorship of agriculture and a class of its students might be honored as its first." In the mind of this illustrious man, it held the first rank as a part of our industry and as a noble pursuit.

With physical boundaries embracing a realm of majestic proportions; peopled by a race of Saxon origin, unquestionable in its valor, unexampled in its powers of endurance, following

every art and grasping every science by that inductive genius which characterizes the mother from whose loins we sprang; with a government founded on the ideas of social equality, personal freedom, and absolute independence; with ample prosperity at home, and commanding respect abroad,—the United States of America, comprehending any and all parallels of latitude on this continent, compacted east and west by the great oceans, with or without the islands thereof; with the religion of the Protestant Reformation pointing its spires to the skies; with peaceful, happy homes scattered over the land, with their untold millions of the children of labor; with no divided banner of nationality over us,—we shall become, in the history of the world, the proudest illustration of that truth which we have sought to maintain—"That National Industry is the true source of National Greatness."

FARMS.

ESSEX.

Report of the Committee on Farms.

For a number of years past, comparatively few entries for the premiums on farms, have been made. The Trustees of the society have, from time to time, endeavored to encourage competition by varying the premiums both in amount and the terms on which they were offered. So far these endeavors have failed to effect their object. The fact still remains fixed, that there is a great barrenness of entries in this department. The subject still merits the careful consideration of the Trustees, therefore, whether the end which they have in view by offering these premiums may not be attained in some way, different from the modes hitherto adopted.

Samuel Raymond, of North Andover, is sole competitor. His farm was purchased in 1850. It was then in an exhausted and dilapidated condition. He has improved it in all respects. The walls have been in a good measure rebuilt, fruit trees large in number and variety have been put out, a portion of the meadow is in an advanced state of reclamation, and an immense quantity of small, loose stones have been removed from the high lands. Taste has also been exhibited in transplanting forest trees around the house and in other arrangements which have undoubtedly wrought a material change in the appearance of the place.

The farm contains about fifty-five acres, all of which except the wood land is now in grass or under cultivation, so that it lacks one important constituent necessary to a complete farm—that is, a good pasture. Being destitute of a pasture, Mr. Raymond has no dairy. We were told that his two or three cows furnished sufficient milk and butter for his own family only. They were fed in the barn until after haying and then tethered in the mowing fields. Consequent upon the absence of a dairy

was a vacancy in the pig pen. Mr. Raymond is industrious in the manufacture of manures by composting, thereby making the most of the means which a limited stock and an unoccupied pig pen can supply. The committee were well satisfied that he had improved his farm very much and that in most particulars his management was judicious. In one respect he furnishes an example worthy of all imitation and so rarely to be met with among farmers that it cannot be too highly commended. Mr. Raymond has kept accurate farm accounts, ever since the place came into his hands, showing the processes and results of all his operations in a pecuniary point of view, and ready for reference at all times. This alone entitles him to much consideration. But the committee, taking into view the entire deficiency of pasturage, the absence of a dairy and the want of swine did not think this a farm so complete in all its appointments as to entitle it to a premium. They supposed that a farm, however worthy in other respects it might be, if entirely deficient in these important particulars, did not so nearly approximate to perfection, as in fixing upon the conditions of the offer the Trustees intended a premium farm should do. The conclusion arrived at by them is to recommend a gratuity of $30 to Mr. Raymond for the improvements which he has made, and especially for the valuable example which he furnishes in keeping correct accounts of the receipts and expenses of his farm.

Two of the members of the committee visited the farm of Leverett Bradley, in Methuen. In 1848 this farm received the highest premium then offered by the society. The same year Mr. Bradley also received the highest premium for improving wet meadows. That tract of meadow, which was the most extensive of its character that had then been improved, remains as it was without having been disturbed by plough or spade or even top-dressed. Its product now averages a ton and a half to the acre, proving conclusively not only how well the meadow was drained in the first instance, but the enduring value of such land when properly reclaimed. Patches of grass land in some specially favored localities and small in extent may be found throughout the county, which constantly yield fair crops of hay without expenditure upon them. We think, however, that nowhere else can there be found a tract of thirty acres which

has had nothing expended upon it for ten years and more, that produces on the average a ton and a half of good hay to the acre and bids fair to do it for years to come.

But what especially attracted the attention of the committee on Mr. Bradley's farm was another tract of twelve acres, the larger part of it meadow, which one year ago was covered with a thick growth of wood. This was cut off last winter and produced about three hundred and fifty cords. Immense ditches were then opened through and around the meadow part of the lot, for the twofold purpose of draining the land and furnishing material for compost. In the spring a large gang of men were put upon it with axes, spades and bog hoes, and the whole surface turned up to a sufficient depth for cultivation. At the time it was seen by members of the committee, the entire twelve acres had not only been dug over and fitted for the seed, but every stump and root which was large enough to obstruct its easy cultivation, had been taken out from the meadow portion of it, and were nowhere to be seen. They had been converted to ashes and those ashes had been spread over and were hastening the decomposition of a peaty soil, deep enough to supply self-fertilizing material for a half dozen generations, in its gradual decay. An instance of improvement so extensive, so thorough, completed in so short a time and in such a manner —for it was all done by hand labor, is without its parallel in the county.

There is a single topic on which the committee desire to make a suggestion. We are often reminded in the speech and in the journal agricultural, that our great mistake is in cultivating too much land; that it will be for our profit to till less and manure better. To do only so much as we can do well, is a good maxim and beyond all cavil. We should never keep more stock than we can feed well, have no larger breadth in hoed crops than we can feed well, and never attempt to cultivate any more land than we can manure well. In the judgment of some of the committee at least, quality is thought to be of as much importance as quantity, in farming calculations. We cannot afford to cultivate *poor* land. If it is necessary to be cautious about cultivating too much, it is quite as necessary that a sound, calculating, business-like judgment should be exercised in choosing those portions of the farm for the application of labor and

manure which will make the largest return for the expenditure made upon them. Now it is a fact not requiring proof, that to a great extent, the very opposite practice prevails. Lean, hungry, barren or worn-out soils, which have no strength in themselves, are planted year after year. Consequently they must be annually supplied with all the elements of fertility which they possess. The reasons why they are selected for cultivation are various. One probably is this, that they would produce nothing if let alone; another, that the predecessors of the present occupants always treated them in this way. Often perhaps the cause may be that they are more conveniently accessible than other and stronger parcels of the farm. Whatever it may be, it is certain, that if a careful account was kept, in nine cases out of ten their meagre products would not pay for themselves. Cultivators of such soils do not count the cost. Were they called upon to take a starving ox and fatten him for the butcher, their first step would be to ascertain if the expense of feeding would not exceed the value of the animal when fattened. And yet without giving the matter a single thought they take a very lean piece of land, manure it, labor upon it, harvest its scanty product which is not worth the cost of production, and never have a suspicion that it is not an exhibition of economy in farm management. But in many instances the poorest lands of a farm are adjacent to the buildings, and the question will be asked, what can be done with them. We answer, sow them with birch seed, cover them with white pines. If they must be cultivated, sow them with buckwheat and keep bees, or throw them down to permanent pasture and feed them with sheep or let them run to waste. The last is better than to throw away money upon them. If manure and labor were applied by us only to those portions of our farms which produce tolerably well without either, they would yield double, quadruple, in some instances tenfold, more than many of the fields do upon which they are now wasted. It will at all times make the difference between getting about half what the manure and labor is actually worth or a double profit on both. Those portions of a farm in themselves fertile always yield an income. Those which are in themselves unproductive, work upon them and manure them as you may, never do. The loss sustained by their cultivation is a charge upon the rest of the

farm. The good acres have to carry on the poor ones. Now if men will expend their manure and labor upon those portions of their farms which because they had strength enough to produce tolerably well of themselves, have received no artificial aid, or have been neglected from other causes, they will do a wise thing. Many old fields cultivated for generations, will be abandoned. Many persons who cultivate at a loss now, or are just able to make both ends meet, because they are fortunate in the possession of sufficient good land to make up the deficiencies of the bad, will find to their astonishment, that they have got money in their pockets at the year's end. If it costs as much to feed a horse as he will earn, he is worthless; an ox is worthless, if it will cost as much to fatten him as the butcher will give for his carcass; a debt is worthless when the expense of collection will exceed the amount of it; and so is a piece of land worthless for the purposes of cultivation when a crop cannot be obtained from it except at an expense equivalent or more than equivalent to its value.

Mr. Raymond's statement, appended to this report, exhibiting what he has done and his mode of keeping accounts, is recommended to the careful reading of every farmer, who has not a good system of his own.

For the committee,

T. E. Payson.

Statement of Samuel Raymond.

The farm I offer for premium is situated in North Andover. It lies in nearly a square body; contains about fifty-five acres; was purchased by me on the 11th of November, 1850, and was at that time divided as follows, say: two and one-fourth acres in tillage, seventeen and three-fourths upland mowing, thirteen in pasture, seven in peat or bog meadow, and fifteen in wood. The soil on the three first named is, what I suppose is called a clay loam, of good uniform quality and depth, resting upon a pan of very hard clay-gravel. From the time of my purchase to the present, I have kept daily accounts of the cost of all crops, improvements, &c., connected with the farm, with such alterations and additions from time to time, as seemed to me neces-

sary. A portion of these accounts are condensed and make a part of this statement.

When I came in possession of the farm, it was much run down; the buildings required large outlays; the interior walls were low and crooked; the grass on the mowing lands was thin and light; all the upland abounded in fast rocks; the pasture had grown up to bushes and birches, with a few sapling oaks and maples; the fruit trees, of which there was about four hundred apple, ten or twelve pear, and five or six peach, were, most of them, in good condition.

As nearly all the division walls required rebuilding, I determined to place them in such manner as would be more convenient for working the land by improved implements and otherwise, and at the same time improve its appearance. To accomplish this I laid out a farm road from my barn, (which stands in the centre of the front of my upland on the easterly side,) twenty feet wide and fifty rods long, in a straight line, and parallel with my northern boundary wall, to a point twenty-one rods distant from my rear or westerly wall, then turning at a right angle and running south in a straight line twenty-eight rods to the meadow, then dividing the upland into two about equal parts, and leaving on one side of the road, eight acres of the mowing, a field of one acre, seven and one-half acres of the pasture, and an orchard of one and three-fourths acres. Trenches were then dug on each side of the road, and filled with small stone; the old cross walls, excepting that between the orchard and pasture, were then hauled and set up anew, leaving gateways at suitable distances. Such parts of the old walls as were not wanted for this purpose, and a pile of stubble stones twenty-two feet long, over twelve wide, and nearly four feet deep, have been carted off. One of the walls removed from this field had been built double, with small stones, which had fallen and covered the ground, in some places to the depth of eight feet. Its length was three hundred and seventy-nine feet. The fast rocks have been dug out, blasted and laid in a cellar wall, under the barn, eighty-three by twenty-eight feet. The wood and bushes have been cut on the part formerly in pasture, the land ploughed, six and one-half acres of the same have been cultivated and thoroughly cleared of stones, and five and one-half acres seeded down to grass, on which I set in the fall of 1856, two hundred

Baldwin apple trees. On this field have been laid sixty rods of stone underdrain.

On the other side of the road referred to, were two fields of mowing and tillage; the one contained about two and one-half, the other eight acres, and about five and one-half acres of the pasture; the wall dividing the two latter lay along on the top of a sharp ridge for about forty-eight rods. For many reasons which it is unnecessary for me to detail, I moved this wall about sixty feet, to the foot of the ridge, and there relaid it. The intermediate land has been cleared of all loose stone and another large pile of the same; I have ploughed and seeded it down to grass. The partly built wall dividing the lots of two and one-half and eight acres, has been removed and laid around my barnyard, in a wall five feet high and four feet wide at the base. These improvements left the field with about eleven and one-half acres, on which I set in 1851 and 1852, two hundred and eighty-four apple, two hundred and twenty-five pear, two hundred and eighty-five peach, thirty-four cherry and five plum, in all eight hundred and thirty-three trees, all budded or grafted with the best varieties. None of these trees have ever stood in grass; the land under them to the width of nine or ten feet being constantly under cultivation. They have made rapid growth since they were set. Some of these apple trees measure at this time sixteen and eighteen inches in circumference; over two hundred of the latter have borne the past season from one-half bushel downwards, the peaches about twenty bushels, the pears a few, and the cherries about one-half bushel. No cattle have grazed this land since the trees were set. Of the four and one-half acre pasture adjoining the above, I have this year ploughed and planted two and one-half acres. As the cultivation proceeds, the stones, &c., are collected into every fifth furrow, to be carted off after the crop is harvested.

Besides the improvements stated above, I have laid a bank wall in front of my house thirty rods in length, with a buckthorn hedge along the line of this for eighty yards. These walls with several small pieces in various parts of the farm, make a total of two hundred and twenty rods built, and one hundred and ninety rods removed; many repairs have been made on the buildings; nearly all the old apple trees have been grafted; all the upland has been ploughed, planted and cleared of stones,

excepting three acres, in doing which I have carted off over three thousand loads exclusive of those used in walls and their trenches; two brick cemented cisterns have been built to increase my supply of manure; fruit and ornamental trees and shrubs have been planted round the house; and I have also set four hundred currant bushes, and a few grape vines, raspberries, &c.

About three acres of the peat meadow have been broken up at a large expense; I have cut the ditches wider and deeper, and have cut the outlet down two feet, through solid rocks, for one hundred and twenty feet.

The end and object of all this labor, has been the production of fruit and grass, ultimately to bring the whole forty acres into these crops, and to secure the same with the least possible expense.

The total cost of all improvements exclusive of my own labor and interest, was on the 1st of April last, ...	$3,847 59
Add the amount I paid for the farm, . . .	3,100 00
Making the cost on the 1st April, 1858, . . .	$6,947 59

As regards the crops, expenses, &c., I refer you to the following accounts, which have never been kept with a view to their future publicity, and all I claim for them is, that they are correct so far as they go. Such omissions as I am able to detect will be pointed out, and such explanations made as seems to be required. In none of these accounts is there any charge for my own labor or services. This, so far as the crops are concerned, would add but little to the cost; neither is there any interest charged on the value of the land. The *whole* labor on the farm is charged under the several heads at cost; the board of laborers at thirty-three and one-third cents per day; the labor of a pair of oxen at ninety-six cents per day; that of a horse at the same; seeds and all incidental expenses of cultivation under the head of cash; manure at one dollar per load of about thirty-two cubic feet; guano, &c., at cost and charges. The crops, so far as practicable, are measured; the charges to family are for chopping wood, cultivating a kitchen garden, &c.; the manure

charged to the crop to which it is applied; no part of it is carried to a succeeding one; the unsuccessful as well as successful crops are here exhibited.

COST OF CROPS AND OTHER EXPENDITURES,

From Nov. 11, 1850, *to Jan.* 1, 1852—13 *months and* 20 *days.*

	Labor.	Board.	Cash.	Total.
Cost of all the crops in, ...	$102 86	$73 60	$31 06	$207 52
Farm expenses, ...	7 65	6 85	252 36	266 86
Total chargeable to crops of 1851,	$110 51	$80 45	$83 42	$474 38
Permanent improvements on farm, .	60 54	59 25	549 90	669 69
Manure for 1852, ...	8 27	7 16	–	15 43
Family, ...	10 13	7 86	–	17 99

CROPS FOR THE YEAR 1851.

	Cash.	Total.
45 barrels apples, ...	$75 50	
Cider apples, ...	12 00	$87 50
5 tons upland hay, at $12, ...	$60 00	
7 tons meadow hay, at $5, ...	35 00	95 00
140 bushels potatoes, at 60 cents, ...		84 00
143 bushels carrots, at 25 cents, ...		35 75
140 bushels turnips, at 20 cents, ...		28 00
31½ bushels corn, at $1, ...		31 50
Beans, peas, &c., ...		14 50
Total value of all crops, ...		$376 25

In the preceding account I find no charge for the labor of oxen or horses; neither is there any for manure. The hay in this, as in the other accounts, is estimated, with a stock of one horse, one pair of oxen, one cow and four two year old heifers. I find purchased and charged in the above account, 5 tons 1,614 pounds hay, at $64.69, to carry them through the winter of 1851–2; and for the same stock I purchased in the following winter of 1852–3, 7 tons 1,842 pounds for $95.30. It appears by the above account, that the crops did not cover the cost of cultivation and expenses, exclusive of manure and team labor, by the sum of $98.13.

There are two reasons which induce me to ask that the accounts for the year 1857, may here be inserted; the one is, that the crops of that year were more satisfactory than those of this; the other is, that the account of that year is fully made up, which cannot be the case with that of the present, as they run from April to April, and all the crops are not yet harvested.

All the omissions I find in the following accounts are the charges of seed on the potato and corn crops; the small accounts for manure charged to second crops, were experiments with guano, &c.

By this account it appears that the crops exceeded the cost of cultivation and expenses by the sum $815.72.

In relation to the hay crop of this and the year next preceding, it will be observed that in 1857 there were in pasture but four and a half acres. On this I put a pair of oxen and three cows. When the grass became short, they were soiled with clover from the mowing land, which decreased the crop to some extent, how much, I am unable to form an opinion. The present year two and a half acres of this pasture was ploughed and planted, consequently the balance, two acres, is unimproved, and three cows and a horse have been soiled the whole season, from the mowing land.

COST OF CROPS AND OTHER EXPENDITURES,

For the Year ending April 1, 1858.

	COST OF CROPS.						PRODUCT OF CROPS.			
Crop.	Labor.	Board.	Team.	Cash.	Manure.	Total.	Yield.	Amount.	Total.	Remarks.
Wheat, ...	$15 27	$7 05	$1 36	$22 81	$6 51	$56 00	$33\frac{3}{4}$ bushels, . 4 tons straw,	$66 50 24 00	. . $90 50	One piece bad; too wet when ploughed
Hay, ...	25 76	15 33	3 12	–	–	44 21	14 tons English, 5 tons mead'w,	$210 00 30 00	$240 00	
Early D. H. Cabbages, . . .	6 76	3 59	1 44	1 00	17 80	30 59	2,729, at 6c, .	. .	163 74	Very large; all headed.
Cabbages on Baldwin Orchard,	15 05	8 95	7 72	3 75	37 91	73 38	4,426, at 5c, .	. .	221 30	Nearly all headed; land full of small roots.
Cabbages on North Feld, . .	13 59	7 46	6 48	2 49	49 73	79 75	. . . . . .	. .	. .	A total failure; all stump-footed.
Potatoes about trees, ...	11 59	6 57	0 84	–	7 22	26 22	$45\frac{1}{4}$ b. large, 80c $10\frac{1}{2}$ b. small, 40c	$36 20 4 20	. . $40 40	Planted to benefit trees.
Potatoes on Baldwin Orchard,	25 42	13 50	4 80	–	0 16	43 88	114 b. large, 80c 11 b. small, 40c	$91 20 4 40	. . $95 60	Land full of roots; no manure; crop good.
Chinese Sugar Cane, . . .	4 48	2 49	1 73	1 00	2 45	12 15	. . . . . .	. .	. .	Very large; not used.

Potatoes on Meadow, . . .	56 26	27 42	–	–	2 44	86 12	$233\frac{1}{4}$ bu. large,	$186 60	. .	Sod very tough; crop fair; rather too wet.
							$50\frac{1}{2}$ bu. small,	20 20	$206 80	
Corn on North Field, . . .	10 13	6 00	2 76	–	20 13	39 02	$38\frac{1}{2}$ bu. at $1, .	$38 50	. .	$\frac{1}{2}$ a crop; succeeded cabbages, which are very injurious.
							$1\frac{1}{2}$ bu. beans,	3 00	$41 50	
Swedes, ...	12 28	6 29	3 48	1 00	14 13	37 18	103 bu. at 25c,	. .	25 75	Crop poor, hollow, and rotten; too wet.
Grass and Clover, for 1858, .	2 80	1 67	3 72	16 76	–	24 95				
Fruit, ...	7 07	4 21	0 12	0 73	–	12 13	33 bbls. apples,	$92 50		
							Cider apples, .	20 70	. .	Very small crop.
							Currants sold, .	16 00		
							Currants used,	4 48	$133 68	
Poultry, ...	–	–	–	4 18	–	4 18	Sold, . . .	$28 30		
							Used, . . .	20 80		
Total, including harvesting, .	$206 46	$110 53	$10 57	$53 72	$158 48	$569 76			$49 10	
Crops after harvesting, . . .	24 10	6 77	–	4 55	–	35 42	Milk sold, . .	$47 12		
Farm expenses, ...	2 42	1 59	0 96	71 86	–	76 83	Do. & butter used	45 77		
Total chargeable to crops, .	$232 98	$118 89	$41 53	$130 13	$158 48	$682 01	Calves, . . .	15 00	$107 89	
Permanent improvements, . .	53 75	42 04	77 64	91 62	14 79	279 84				
							Manure, charg'd	$189 60		
Family, ...	16 21	16 67	10 92	–	16 33	60 13				
							" cost, .	108 13		
Manure for 1858, ...	4 42	5 91	6 72	–	–	17 05			$81 47	
	$307 36	$183 51	$136 81	$221 75	$189 60	1,039 03			$1,497 73	

The stock on the farm this year and the last, consisted of two horses, a pair of oxen, three cows and a heifer. They consumed no meadow hay the past winter, but were entirely supported on the upland hay and clover. It is my intention to work the farm in the future with horses, to dispose of my oxen this fall, and in their stead place three cows, and add two or three heifers to my present stock.

The farm stands at the present time as follows, viz.:—

$16\frac{3}{4}$	acres in	upland, mowing and orchards.
4	"	meadow mowing.
$6\frac{1}{2}$	"	wheat, seeded down with grass and clover.
$9\frac{3}{4}$	"	tillage.
3	"	unimproved pasture (1 acre ploughed).
15	"	wood.
55 acres.		

North Andover, October, 1858.

MIDDLESEX.

ESSAY ON FARM MANAGEMENT.

BY JOSEPH REYNOLDS.

Instead of writing an essay in the usual form, and giving directions for the management of a farm, I propose to tell in a plain, straight-forward style, how my neighbor, James Wiseman, has managed his farm.

His story is not without instruction, and will probably be read with quite as much interest as the same lessons conveyed in a more formal and didactic style.

James was the eldest son of Jonathan Wiseman. He had two brothers and one sister. Jonathan was a diligent, hard-working man, of good moral habits. He owned a farm of about one hundred acres, in one of the towns of this county, and carried it on in the usual style in which farms were cultivated in this State, fifty years ago.

He brought up his boys in habits of industry and honesty. Indeed, as soon as they were large enough he kept them constantly at work on the farm. Some of his neighbors were disposed to think he made them work too hard; but as they were strong and active and always in good health and spirits, there was no proof that they were overworked.

They attended the district school two months in the winter and learned to read, write and cipher. James was thought to have quite a turn for mathematics, and by the time he was eighteen, he had mastered Pike's Arithmetic, and could measure a load of wood, and a stick of timber, and could survey a piece of land, provided it were inclosed in tolerably straight lines. He was his father's chief assistant, until he was nineteen years old. His next brother being then able to take his place, his father, by way of assisting him to an outfit when he should be old enough to commence life for himself gave him permission to hire himself out to 'Squire Jones, who lived about three miles distant.

'Squire Jones needed a trusty young man to work on his farm, and agreed to give James twelve dollars a month and his board. He worked diligently through the year, and at the close of it, found himself in possession of a hundred dollars, a new suit of clothes, a gun and training equipments. The second year, 'Squire Jones gave him fourteen dollars a month, and made him his foreman, for he employed three men through the summer, and two through the winter. At the end of the second year, 'Squire Jones gave him his note for one hundred and twenty-four dollars, which he preferred to the cash. James continued in his service four years longer, at the same wages. He was now twenty-five years old, and had about seven hundred dollars in good notes. He now thought he should like to see a little more of the world; so in the month of April, he started for Boston, and from thence proceeded in search of employment to the good old town of Dorchester. There he let himself to a farmer, who was principally engaged in raising vegetables and fruit for the Boston market. Here he obtained sixteen dollars a month, for eight months. At the end of this time, having received his hundred and twenty-eight dollars, he returned home. He was now master of eight hundred and fifty dollars, and he thought it was about time to become settled

in life, and to this he was the more inclined, as he found within himself a growing attachment to Miss Betsy Fletcher, the daughter of a widow who lived in the vicinity of 'Squire Jones.

About this time, there was for sale a small farm of about thirty acres, with a tolerably good house, and a small barn upon it, some two miles from the centre of his native town. This he purchased for twelve hundred dollars, paying down five hundred, and mortgaging the farm for the balance. The remaining three hundred and fifty, he expended in the purchase of a yoke of oxen, horse, two cows, a cart, plough, harness and tools, and went to work upon his farm in the month of March.

The farm was most of it good land, but had been rather severely worked. The fences were out of repair, and he set himself at work to put them in a safe condition, for he had observed, that among farmers, good fences are not only necessary for the security of the crops, but also for the preservation of good neighborhood. In the process of preparing his fences, he cut down a good many straggling trees, and collected stumps and roots, and brush sufficient for his year's supply of wood. He next scraped together what manure was to be found on the place. Finding the hearth of an old coal pit on the field of a neighbor, who was willing to give it to any one who would remove it, he carted some dozen loads of it to his barnyard and mixed it with the manure he had collected together.

He then prepared a patch for a garden, and planted some peas, and beans, and sweet corn, and a bed of beets, carrots, parsnips, and onions, and a few hills of cucumbers, and squashes, and melons.

He had learned while living at Dorchester, how to cultivate a garden, and that it was the most profitable part of the farm. He then ploughed four acres of his best land in a thorough manner. He ploughed it so deep, that one of his neighbors who observed the operation, told him he would spoil his soil, and get no crop. But he had picked up the idea, that when a soil had been pretty well exhausted on the surface, it would be well to bring up a stratum from below, that had not been exposed to the atmosphere, and in which elements had accumulated that might afford nutriment to his crops. Then he carted on his manure, and as he had but a small supply, he distributed it in the hills, and planted one acre of potatoes, two acres and a

half of corn, and sowed half an acre of wheat. He then ploughed up a strip of soil by the roadside, where the wash of the road had been accumulating for a long time, and carted it into his barnyard and pig-sty, and purchased a couple of shotes.

While carrying on these operations, he managed to work a number of days with his team, for such of his neighbors as required his assistance. Sometimes he worked for cash, and sometimes exchanged work.

Thus he went on till hay time. He cut his own hay in good season, hiring a boy a few days to assist him, and then worked a month for 'Squire Jones, assisting him to secure his hay and grain. The last time he hoed his own corn, he sowed a plenty of turnip seed. After he had secured his crop of spring wheat, he dug a ditch across the lower end of his field, about ten rods long, and carted the mud and soil which he threw out, into his barnyard and pig-sty. That which he put into the yard he spread over the surface and ploughed it in with the soil, which he had placed there in the spring from the roadside. This process he repeated about once a week through the fall.

His sister was his housekeeper through the summer and autumn, and she took good care of his small dairy. He harvested his crops in good season, and found that he had three hundred bushels of potatoes, seventy-five bushels of corn, and seven bushels of wheat, and three cart-loads of turnips, and a good store of garden vegetables.

Of this crop, he sold two hundred bushels of potatoes for fifty dollars, fifty bushels of corn for thirty-seven dollars, and a hundred and twenty pounds of butter for thirty dollars. He also had a plenty of apples for his own use, and some forty bushels of poor apples, which instead of making into cider, he fed to his pigs. During the year, he had worked out with his team to the amount of somewhat more than a hundred dollars. He was able at the expiration of a year from the time he had purchased his place, to pay his taxes, the interest due, and a hundred dollars on the principal; and he had made several valuable improvements on the place.

On Thanksgiving Day, he was married to Betsy Fletcher, to whom, as we have before said, he had been long attached. She was an intelligent, industrious girl, of about his own age, and had accumulated, chiefly by her own earnings, about three

hundred dollars, which enabled them to furnish their house very comfortably. Now we may consider James as fairly settled in the world. He determined in the first place to pay for his little farm, and at the same time to improve it as much as possible. His wife entered into all his plans, and assisted him with a hearty good will. She was willing to deny herself many present gratifications for the sake of permanent independence. He made his house as comfortable as he could, by such repairs as he could make himself, and decided to lay out but little upon it until he could fairly call it his own. About four acres of his pasture lot, which lay a quarter of a mile from his house, had so much young wood upon it, that he thought it best to let it grow up to wood. The remainder, about six acres, he concluded to clear up, and bring into a more productive state. During the winter, after he was married, he cleared the wood and stumps and brush from about two acres, and thus, with the addition of a few old apple trees, he collected wood enough for another year. In the spring, he procured a hundred young apple trees and set them out on a part of the field which he had cultivated the previous year. He had learned at Dorchester, that fruit was a profitable crop. He made a good selection of thrifty trees, and took much pains with their cultivation, and in a few years his orchard was considered the best in the whole neighborhood. In the spring, he laid out his work for the year, with much care and forethought. By the help of his pigs and his stock, and the compost material which he had provided the previous year, he had quite a pile of manure. This he overhauled and mixed well together. He laid down two acres of the field of the former year to oats and grass, and ploughed up two acres more. As soon as he had completed his planting, he set about collecting material for compost; indeed, he kept this object steadily in view the whole year. He scrubbed up his headlands, digging out the bushes, and throwing the soil into heaps, to be carted home whenever he had leisure. Twenty acres of his land lay in one piece, inclining a little to the west; a portion of it was cold, springy land. During the year he cut two more ditches, for the double purpose of obtaining material for his yard and sty, and of improving the quality of the grass. This year also, he worked out with his team to the amount of more than a hundred dollars.

He had a fine litter of pigs in the spring, four of which he sold for three dollars apiece. This year he raised two calves, anticipating that he should soon be able to keep a larger stock of cows. His wife procured from her mother three hens, and raised three fine broods of chickens. At the end of the year he was able to pay his interest and a hundred dollars more of the principal, and purchase a horse, wagon and harness, and buffalo robe, and several tools which he needed.

But we will not follow neighbor Wiseman year by year, in his progress. At the end of five years, he had paid the seven hundred dollars which he owed for his farm. The mortgage was cancelled and the farm was his own. He had a fine yoke of oxen and a good horse, five cows that were considerably better than the average of his neighbors', four pigs, a couple of cosset sheep, quite a flock of hens and geese, and last, though by no means least in his estimation, a fine boy and girl. His farm, in the mean time, had been steadily growing more productive. It produced nearly double the hay it did when he moved on to it. His apple trees were beginning to yield fair and beautiful apples. He had a large garden stocked with plenty of currants, peach trees, plums and cherries, and the year before he had set out a St. Michael, and a pound pear, both which were thriving, and promised in due time to furnish them with a supply of their luscious fruits.

Who was happier and more independent than James? He had his troubles like other men, it is true. He had to work hard, and early and late, and eat the bread of carefulness. The borers and caterpillars would prey upon his apple trees. The mice would find their way into his corn-bin. The early cucumbers and corn would sometimes be nipped by the frost and have to be planted over again; and every few years, the corn and potatoes would be injured by the early frost. Showers would come in hay time, and sometimes a long rain just when his rye was ready to reap, and a cow would occasionally have the garget in her bag; but, notwithstanding all these troubles and trials, he was happy and cheerful, and enjoyed the fruits of his labor.

Neighbor Wiseman's farm had now so much increased in productiveness, that he found it necessary to have more barn room. The old barn was not very good, hardly worth repairing,

and it did not stand in the right place. He had seen two or three barns, and had heard of several others, which had cellars under them, and had thought the matter over a good deal, and had made up his mind that whenever he built a barn, he would have a cellar under it. He had not the means of paying for his barn in cash, but he determined to set about it and do what he could towards accomplishing it with his own hands. So in the early part of the winter, he purchased a lot of standing trees, and hired his brother to work with him. They cut down the trees, and hauled the board logs to the mill, to be sawn into boards and plank, and cut the smaller timber into suitable dimensions for a barn sixty feet by forty, and hauled it home and hewed it. This, with the care of the cattle and hogs, kept him busy through the winter. In the early spring, they dug the cellar and laid the walls, and hauled the boards from the mill, and by the commencement of hay time, the new barn was ready for the hay. The barn was not clapboarded nor painted, nor furnished with ventilators, or blinds, or the many appliances which fancy barns of the present time so often exhibit. In short, it was not built in the style in which he has since built a hundred foot barn. But it was as good as he could afford, and indeed he had to hire three hundred dollars of 'Squire Jones, to enable him to pay the carpenters, and for the shingles and nails. But it was a great improvement on the old barn, which, the next winter, was pulled down and converted into a shed and hog sty. The next year he shingled his house, and in the course of two years he had paid his borrowed money, and was again free from debt. He had for sometime had his eye upon a lot of land containing about twenty acres, half pasture land and half covered with a growth of young hard wood, which lay at a convenient distance from his house. The following winter he purchased this lot for three hundred dollars, and agreed to pay one hundred dollars a year until it was paid for. The first year he cut off thirty cords of wood, and ran a fence across the lot, so that he might use the pasturage, and sowed three acres of rye. His wood when cut, was worth three dollars a cord, and he raised forty-five bushels of rye, worth a dollar a bushel. By the sale of the wood and the rye, he was able to pay the first instalment and the interest, and had rye enough left for the use of his family. He had been in the habit, from the commence-

ment of his farming, of raising all his own grain. Sometimes he raised wheat and sometimes rye.

He was now able to keep eight cows, and he had raised them all himself, except the first two. He took good care of his calves, and fed them well, from the time they were taken from the cows, and kept them always in a thriving condition. He never allowed them to get lousy, or become stunted, but supplied them well the first winter with rowen hay, and turnips and other roots. His cows too, were well cared for, and he found that by keeping them warm in the winter, and feeding them with a mess of turnips daily, through the cold weather, they gave more and better milk, and came out strong and healthy in the spring, and did not have to lose two or three months in the summer, to recruit what they had lost in the winter.

He became quite proud of his stock of cows, for he had the reputation of having the best cows in town, and of making the most butter for the number of cows. This resulted, as he was well aware, from having raised none but promising calves, and his having taken good care of them. His wife always took great pains with her butter, and the man who carried it to market, always returned her one or two cents a pound above the price of common butter. Neighbor Wiseman learned by experience the value of the turnip crop, and always laid out for a good supply of flat turnips for the fall and early part of winter, and of ruta-bagas, for the remainder of the winter. Although most of his neighbors believed that turnips were of little value, yet somehow, by their use, his cows did better and made more butter than theirs, and when he had occasion to fatten one, she made good beef, in less time, and at less cost, than they could make it.

In about three years from the time he purchased the twenty-acre lot, he purchased a piece of meadow with a strip of woodland adjoining. He now had his barn quite full of hay and grain when he gathered in his harvest, and began to think it necessary to enlarge it. So he made his arrangements, and prepared to add forty feet to his barn the next season; and as he now had four stout oxen, he soon had the timber on the ground, and the board logs at the mill, and before the end of the next season, he had a fine barn, one hundred feet long and

forty feet wide. This time he put in a few extra windows, and set his barn doors on rollers, and built a tight board fence around his cow yard, to break of the wind from his cattle when they were in the yard. He took great care of all his stock, young and old. As he had raised them all himself, he knew their several characters and habits, and they were well acquainted with him, and knew his voice and step. They had all been accustomed from their earliest days, to look to him as their best friend and protector, and to conform to his will, so that he never had any difficulty in managing them. He thought the best time to handle steers and break them in, was when they were calves, and this he had always done, and no oxen in the neighborhood were so well broken, and so sure on a hard pull, as neighbor Wiseman's. He never required more of them than he knew they could do, and they soon learned that they could do whatever he required. They trusted his judgment, and never refused to obey his orders. He believed that when more is required of the patient ox than he is able to do, he will soon learn to refuse to do what he can, and thus he is spoiled for service. His cattle were never breachy, for he kept good fences.

His cultivated fields were now inclosed with substantial stone walls. His land contained a good supply of stones, and he had dug them out of his fields, where they were worse than useless, and laid them into walls, where they did good service. This he had done, a little at a time, as he found opportunity, and thus not only made his fields more secure, but much easier of tillage. He added new improvements and conveniences as he found himself able. He had now two boys and two girls, all bright and healthy. He kept those who were old enough at school, while the district school kept. His oldest boy was now big enough to be useful in many ways, and he kept him employed with him, when he was not at school, and taught him to manage the team, and ride and drive the horse, and tend the cows, and do all kinds of work, for which his strength was competent. Neighbor Wiseman was now considered one of the most thrifty, well-doing men in town. His neighbors finding him successful in all his plans, often consulted him with regard to their crops, and farming arrangements, and seldom had cause to regret that they had followed his advice. He was public spirited, as well as economical, and was always in favor of

every measure that he believed would promote the public good. For many years past, he has taken an agricultural paper, and always read it with much interest, and has derived from it many valuable hints in the management of his farm. He is a member of the County Agricultural Society, and has several times taken premiums for his cows and his butter, the only objects he has offered for premiums. He says he takes a premium for his butter with more satisfaction than for any thing else, because in this case, his wife shares the credit with him.

Neighbor Wiseman has continued to thrive to the present day. He is now fifty-six years old. It is about thirty years since he purchased his farm of thirty acres. He has at present, a hundred and twenty acres, some thirty of which are woodland. The rest is pasture, meadow and tillage.

His house is in good repair. He has painted it three times, and a few years ago fitted it with blinds and put it in thorough repair. His barn we have already described. This he has lately clapboarded and painted, and fitted a ventilator to the top, rather to be in fashion, than because he considers it of any real value. His barn cellar, he has learned by experience, is the place that requires more labor and attention than any other on his farm, and he says no other labor pays so well. His meadow furnishes material for composting in the cellar, and he keeps a year's stock always thrown out, that it may be pulverized by the frost, and get well dried the next summer, before carting it to the yard and cellar. He says one load of well dried muck is worth two of heavy wet muck, for it will absorb twice as much liquid from the stable, and besides is much easier to handle. He has constructed a reservoir at a short distance from the rear of his house, into which the soap-suds and the sink drain are conducted. This he keeps well supplied with dried muck, and covers it with plank. He cleans it out twice a year, and strews over it a quantity of plaster, and says he finds it an excellent manure for his garden, and especially for his fruit trees, of which he has now quite a variety. He has never purchased any imported or artificial fertilizers, except occasionally a little plaster, which he first procured as a means of preserving his vines from the ravages of the bugs. He finds this useful in the cultivation of potatoes, as it preserves them from the worms. When he puts a small handful

of plaster in the hill, he says the potatoes come out smoother and handsomer, and will bring enough more in the market to pay for the plaster several times over.

His belief is that every farmer should rely mainly upon his own resources for manures, and that except in extraordinary cases, he should not attempt to cultivate any more land than he can provide manure for from his own farm.

Neighbor Wiseman endeavors to keep up with the times, and he avails himself of every new implement, or new method of cultivation, which upon careful examination commends itself to his judgment.

He has tried raising milk for the market, instead of making butter. This he did principally from regard to his wife, hoping to relieve her somewhat of the labor of the dairy.

While selling his milk, he cut a large portion of his hay for his milch cows, and moistened it, and added a portion of cob and corn meal to the feed, night and morning. But he found it on the whole less profitable than making butter. The relief to his wife was less than he anticipated. The daily labor of cleaning the cans was new to her, and quite as hard as the straining and skimming of the milk, and the working and packing of the butter. As for the churning, she had rarely done that, since they had more than two cows. He found he could not keep as many pigs as formerly, and the manure from the pig-sty was diminished.

Occasionally his milk was not all wanted, and the butter apparatus not being in order, the extra milk was of little value, except for the hogs. After trying it three years, he returned to the butter making. He now keeps twelve cows, and sends the butter to market weekly.

He concludes that this is the most profitable disposal he can make of his milk, and as his wife thinks a good deal of her skill as a butter maker, she says she likes it the best. She has a neat, airy milk cellar, with a clean brick floor, and shelves as white almost as the milk itself. It is a pleasure to see the long rows of tin pans upon them, filled with milk, or to see the pans on a bright day after churning, glittering in the sunshine.

Neighbor Wiseman has crossed his cows with the Ayrshire and the Devon stock, and he thinks it has resulted in a marked improvement of their milking properties, though some of his

neighbors think the improvement is owing to his always selecting and raising only the best specimens of his own stock, and to the very great care he takes of them when young, and to his always keeping them in high condition, and indeed I partly agree with them, for I believe a well fed cow will not only give more, but better milk, than a lean, half-fed one. But whatever it may be owing to, he has several cows that make ten or twelve pounds of rich butter in a week, during the best of the feed.

He usually raises six calves every year, and of course he is able to dispose of three or four cows every season. He never sells his best cows, but those he does sell bring the highest price in the market.

Neighbor Wiseman has raised two or three colts in the course of his life, but he thinks it not best for one man to attempt to do too many things.

He is fond of a good horse, but he thinks the raising of horses requires a great deal of time and attention, and that those will succeed best who give their attention mainly to this branch of husbandry.

He understands rearing cattle better, and he says it is better for him to purchase a horse once in five or six years, than to attempt to raise one.

I have frequently asked myself the question, what is the secret of neighbor Wiseman's success? He is a plain, common sense man, no ways remarkable for his physical or mental endowments, and he does not labor harder than many other farmers of my acquaintance. I have come to the conclusion, that his secret, if he has any, is, that he plans all his work with great forethought and care; that he never commences his work until he is ready, and then always works to the purpose.

He has a faculty of always hitting the nail on the head, and thus making every stroke tell, so that he wastes no strength, nor loses any time in useless labor.

Whatever he does, he does with reference to the future, as the present, and thus all his improvements are permanent and substantial.

When he raises a calf, his object is not only to get a good cow, but to improve his breed of cows.

When he cultivates a piece of land, he aims not only to get

a good crop this year, but also to leave the land in a better state than he found it.

Thus when he makes a step in advance, it is so much actually gained. He has not got to go over the same ground again.

This is the way neighbor Wiseman manages his farm.

If I had a hundred pages, instead of fifteen, I would talk about managing a farm in a different way.

But I think something may be learned from the experience and example of neighbor Wiseman.

HAMPDEN.

From the Report of the Directors on Farms.

The directors, in laying before the farmers of this county the results of their experience and observation, not only for the past year, but for the past three years, feel it a pleasure to be able to notice the growing interest manifested by many of the farmers as seen in numerous well-directed efforts for a higher state of cultivation ; improvement of old and worn-out lands, and reclaiming those that have hitherto been entirely worthless, causing them to produce fine and luxuriant crops. It being our duty in part to visit and examine those farms entered for premium, a duty which has required not a little time, each farm having to be visited twice each year, yet it has been attended to with much pleasure and satisfaction. For we notice a desire to excel in the cultivation of the soil in numerous instances, where but a few years since no such interest was manifested. Among the farms of which it becomes our duty to speak more particularly in the printed report for this year, are those entered by Phineas Stedman of Chicopee, and H. M. Sessions of South Wilbraham, who entered theirs in competition for the Society's premium of fifty dollars offered in 1856 for the best conducted and most improved farm during the ensuing three years, taking into view the entire management and cultivation for that period, including lands, buildings, fences, orchards, crops, stock, &c., with statements in detail relating to the management of said farms. The formation of soils upon

the two farms are so entirely different from each other, requiring different modes of treatment to obtain the most satisfactory results, that your committee have been enabled to witness how much may be done in reclaiming a low, worthless bog, not worth a hundred mills, to be worth more than as many dollars per acre; and again how the rugged hill sides, and unsightly valleys, being disincumbered of their rocks and stones, accomplishing a twofold purpose and use, that of getting them out of the way, and also using them for under-drains to conduct off the surplus water, may be made to yield *more* than two spires of grass where only one grew before, and of a much finer quality. These farms were both visited twice in the year 1856 in the month of June, and again in September, once each in 1857, and again twice this year. Mr. Sessions' improvements, which are very conspicuous and lasting, have been accomplished by the removal from the surface of a mass of rocks and stones, and putting some to a useful purpose in the shape of under-drains, a large number of which he has built, and others, into substantial and durable fence. And now the most casual observer cannot help noticing the great improvement in the grass; in quality as well as quantity. The only drawback to this mode of proceeding of which we could speak, is the frequency with which the drains seem usually to occur. The subsoil is so hard and impervious that the water cannot percolate through but a short distance. But the energy and persevering efforts of the enterprising proprietor, seem to have overcome even this, and he feels that he is amply paid for it. Other improvements are noticeable on this farm; the house has undergone thorough and valuable repairs, and Mr. Sessions being an advocate of the Devon breed of cattle, has purchased and placed upon his farm some of the finest specimens of pure Devon to be found in the country. The rearing of an improved class of horses also, has not escaped his attention. The most noticeable improvements upon Mr. Stedman's farm, have been accomplished upon some six or eight acres of low bog, most of which was entirely worthless so far as cultivation was concerned. By bogging, filling and draining, this piece of ground has been brought into a condition which bids fair to become the most valuable mowing land upon the farm. Such an entire change and reclamation have been produced upon this spot of ground,

that none but those who saw it in its original state could hardly believe in the wonderful change that has been wrought upon it. And the successful operations carried on here, it is to be hoped, will be thought worthy of imitation by others in the same locality as well as those more remote.

One great secret of successful farming is not lost sight of here, as will be seen in large quantities of well-housed composted manure, which gives in return, not only heavy crops of grain and grass, but most enormous crops of roots, the raising of which is of no small importance to every farmer that keeps a stock of cattle. When twenty tons of mangold wurtzel can be grown upon an acre of land with no more labor than it requires to raise an acre of corn, it would seem that there could no longer be a question about the utility as well as profit of such a crop. And more than this has been produced by Mr. Stedman upon one acre of his land, or at this rate, this season. Unlike his competitor, (Mr. Sessions,) Mr. Stedman has given his attention to the breeding of pure Shorthorns, and has some very noticeable specimens. Every thing connected with this farm seems to have the proper attention of its proprietor, and a rich reward is reaped for such attention. In deciding upon the merits of these two farms, the directors found it very difficult to decide which, alone, was entitled to the premium; either well deserving it, and if the funds and rules of the society would have admitted of it, the directors would with pleasure have awarded the fifty dollars to each, knowing that it would not be unworthily bestowed. But under the circumstances they were unanimous in dividing the fifty dollar premium equally between the two, and Mr. Stedman has generously given his half back for the use of the society.

H. E. MOSELEY, *for the Directors.*

Statement of Phineas Stedman.

In presenting this my third annual report, I have nothing of marked interest or importance to communicate. While I can see some improvements both special and general, I am only more conscious of the need of others on every hand. I can present no statements of large or unusual crops, my object

having been rather to improve the general productiveness and fertility of my farm by judicious management in the cultivation and expenditure of the crops. By comparing the present with former statements, it will be seen that some advance has been made in the gross amount of crops, and I have no doubt that the same or a greater ratio of increase is easily attainable for the next three years. The bog and waste land (seven acres) to which allusion was made in my first statement, has been so far reclaimed that not a bog remains, and most of it has been brought under cultivation, producing good crops annually. This has been accomplished by removing the surface water by means of open drains, cutting and removing bogs, then ploughing and planting with buckwheat or potatoes. Buckwheat has been used solely as a first crop until the past season. In the spring of 1858 about one acre was planted with potatoes. A heavy fall of rain immediately after planting, and before the drains had been suitably cleared, occasioned many vacancies; yet this acre produced ninety-six bushels of the finest looking Jenny Lind potatoes I have ever seen, and entirely free from disease. Other portions of this mucky ground have been planted with potatoes the past season, and are also free from disease, while upon higher ground and good loam adjoining, many show signs of decay. About one acre which has had less bogs upon it, but was formerly quite as wet and nearly as worthless, has been made to produce good grass by covering the surface with earth, (cutting some of the highest bogs,) applying twenty loads of compost manure, and sowing grass seed. This was accomplished during the last winter and spring. It has been mown twice this season, producing as we judge, two and one-half tons of good hay. When I stock in this way, I sow oats with the grass seed, which being cut for hay, increases very much the yield of the first crop. One acre which has been under cultivation the past three years has this autumn been prepared for grass by the application of two hundred ox loads of earth, followed with fifteen of manure. The seed was sown the fifth of October and is looking finely. The cost of carting and spreading the earth has been about eight cents per load, or sixteen dollars per acre. Most of the earth used in both the above instances needed to be removed to furnish an outlet for the water. The muck taken from the ditches in the

meadow has been composted with manure and applied to other lands, and is, I am confident, worth more than the expense of digging and carting. The expense of reclaiming this meadow, is, therefore, confined to the cutting and burning, or otherwise removing the bogs, and the application of earth. This last, while I am not certain that it is absolutely essential, is I think expedient, because of the super-abundance of vegetable matter in the composition of the meadow. Adjoining the above acre I sowed grass seed upon one-half acre of land, on the eleventh of September, without the application of earth or manure, and very little grass is to be seen. I think manure without earth would not have secured its growth. Neither am I certain that the application of earth without manure would have done so. But had the two been applied as in the other case, I have no doubt the result would have been equally favorable. Having more earth I wish removed, I intend during the present month, (November) to apply it to this and adjoining land and restock. As the distance or "average haul" is an important item in removing earth, I will state that in all the above cases it does not vary much from thirty rods. My crops have been uniformly good, yet none remarkably so. Eleven acres have been mown, producing by estimation about twenty tons of hay. One and one-half acres was clover, mown twice, then sowed to rye August 24th, and is now a fine pasture for calves, which have grazed upon it since the fifteenth of October. A small field of spring wheat, one and one-fourth acres, is perhaps among the best. This was sowed the tenth of April, two and one-half bushels per acre. The wheat has not all been threshed, but judging from what has been threshed, which I think a fair average, the yield is thirty-two bushels per acre. Of oats I had five acres, some of which were very heavy, others only ordinary, the average yield I think fifty bushels. Corn seven and three-fourths acres including two acres much injured by the *wire worm*, produced six hundred and ninety bushels of ears. This is of the kind called Demond corn, and two bushels of ears produce thirty-eight quarts of corn. Potatoes have been grown in broken patches, and the ground not all measured. The yield has been about four hundred and fifty bushels. Of mangold wurzels, I have forty-four rods, from which we have just harvested six tons two hundred and ten pounds of well trimmed

roots. In the same field I have carrots upon one side and Swedish turnips upon the other, with a few rows of cabbages interspersed. Two rows of the mangold wurzels weighed when trimmed, two thousand two hundred and ten pounds. The same of Swedish turnips weighed one thousand four hundred and twenty pounds. Upon two rows of cabbages were two hundred and ninety merchantable heads. The rows were alike in each, being two feet six inches apart. The same ground in carrots gave one thousand two hundred pounds, the rows being eighteen inches apart. The cost of cultivation was nearly the same, (except carrots) which were more. Value of crop:—

2,220	pounds	Mangold wurzels at $8 per ton, is . .	$8 84
1,420	"	Swedes at $8 per ton, is . . .	5 68
1,200	"	Carrots at $12 per ton, is . . .	7 20
290	heads of	Cabbage at 3 cents per head, . .	8 70

Of carrots we have fifty-three rods, the produce of which was two hundred and fifty-six bushels of forty-five pounds each. One and one-eighth acres of Swedish turnips not all harvested, will probably yield six hundred and ninety bushels. About five acres of common turnips of different varieties complete the list of root crops. Most of them were sowed broadcast, and are yielding fair crops. Three acres after a crop of rye had been harvested, and two upon sward previously pastured. About one and one-half acres were sown in drills two feet four inches apart, and manure applied in the drill to the amount of thirteen loads, or three and one-fourth cords per acre. These were sown August 7th, too late to attain a full growth. They have been hoed once and thinned, and yield four hundred and sixty bushels per acre. My corn was planted with Woodward's Planter, and required but one day's labor of a man, boy and horse. Hay and grain were cut by Kirby's Combined Machine, which is manufactured by B. B. Belcher at Chicopee Falls, and is, I think, one of the best.

In the following table we give a condensed statement of the principal crops grown upon the farm for the three years:—

	1856.	1857.	1858.
Hay, ...	23 tons,	18 tons,	20 tons.
Corn, ...	80 bushels,	350 bushels,	409 bushels.
Oats, ...	320 "	40 "	250 "
Wheat, ...	–	12 "	40 "
Rye, ...	35 bushels,	35 "	40 "
Buckwheat, . . .	–	52 "	–
Mangolds, ...	–	2,115 pounds,	12,215 pounds.
Swedes, ...	415 bushels,	980 bushels,	690 bushels.
Carrots, ...	600 "	399 "	256 "
Soft Turnips, . . .	–	600 "	1,500 "
Potatoes, ...	110 bushels,	225 "	450 "
Cabbages, ...	–	300 heads,	600 heads.

STOCK.—My farm stock consists of three horses, six cows, two bulls, one ox, two heifers two years old, three yearling steers, three bull calves, four swine. The amount realized for stock sold during the year, is seven hundred and sixty-eight dollars; the amount expended is eighty dollars. The value of stock now on hand I think does not vary much from that of last year. The bull and ox have been worked together. During the winter they were worked only occasionally. In April they were weighed. The bull is five years old and weighed one thousand seven hundred and thirty two pounds; the ox is nine years old, and weighed one thousand five hundred and fifteen pounds. They were put to work, the yoke varying in length, about in proportion to their weight. They have been worked most of the time, either upon the farm or for others; they have been well, and fed alike, sometimes in the barn and sometimes in the pasture. Their weight—of the bull, at this time, is one thousand seven hundred and five pounds, and the ox, fifteen hundred pounds. I can say, therefore, that in this case at least, I have perceived no injurious effect from working the two together, and I believe the real difficulty more frequently is in being unequally matched, either in strength or disposition. My cows have been soiled mostly, being kept in the barn, except about two hours in the morning, when they were allowed

to graze. From July 20th, to September 26th, six cows and one yearling were fed from one hundred and five rods of corn sowed for that purpose. The corn was sowed in drills twenty inches apart, at the rate of three bushels per acre. This, with one quart of meal, (rye and corn,) per day, with grazing two hours in the morning, was their entire living. I have never before fed so entirely upon green fodder, and think I have never had stock do better. They have held their condition better than ever before, which I attribute to regularity of food, and freedom from the annoyance of flies. It may be thought out of season to speak of *flies*, but in my estimation, it is a matter of no small consideration, and any who have not observed it, will be surprised to notice the avidity with which animals thus accustomed, will seek a retreat from these annoyances. The subject of soiling is, I am happy to know, being brought into more general practice by agriculturists in this vicinity, and I have no doubt this, with the more thorough and extensive cultivation of root crops, will rank high among the improvements in agriculture of the present age. I have sown seven-eighths of an acre of rye, which I design for soiling in the early part of next season, then use the land for a crop of Swedish turnips. The barn is forty-six by sixty-five feet, with eighteen feet posts, and a basement seven feet in height. The basement eighteen by thirty-two feet, is connected with the room above, and is used for storing hay; sixteen by twenty-three for roots, and the remainder for stabling and manure. A part of the stabling is upon a level with the main floor, and directly over the manure cellar. The swine are kept upon the manure, and make themselves generally useful by composting it with muck and such refuse as is afforded them. The manure is all kept under cover till hauled to the field, either for direct application, or further composting. My cows and such other stock as are kept near the barn, have been stabled at night, for the last thirteen years. The chief object of this is the saving of manure, which I have ever made a prominent point. Well do I remember the first accumulation of manure under my barn in the summer of 1855, (the droppings of two cows,) and remarking to a neighbor on the number of loads of manure thus produced, when he coolly replied that I might call it so many loads of *stuff*. The barn has been re-covered and painted,

the past year, and the buildings are in good condition. The income from the dairy I have not kept as accurately during the last year as formerly. Can say, however, that it has been satisfactory. My bills for labor, including board the past year, have been four hundred and seven dollars. This does not include my own labor, or that of my son, now fifteen years of age.

CHICOPEE, November 1, 1858.

NORFOLK.

From the Report of the Supervising Committee.

It were absurd, of course, to suppose that all may surround themselves with the comforts, conveniences and enjoyments wealth can procure. Few have a larger share of means than daily necessities require; and many can only with difficulty avoid or escape the embarrassments of debt. Still, the importance of making the place, where life is to be spent and its chief happiness found, neat and tasteful in exterior appearance and comfortable and convenient in interior appointments, cannot be doubted. Far more important is it than the enlargement of one's acres, the increase of his title-deeds or bonds and stocks. Especially is the possession of an attractive and delightful home, offering abundant means of mental improvement and social recreation and enjoyment, to be counted among the best safeguards of youthful virtue and sources of youthful happiness. The associations which cluster around such a home will be strong inducements, also, to the farmer's sons to continue and be content with the occupation of their father.

Let the farmer then consider it a duty to provide for his home all the comforts, conveniences and enjoyments he can honestly afford. Let him recognize his obligation to promote the social welfare and strengthen the social ties of his neighborhood. Let him cultivate the earth, not merely to fill his barns and granaries by exhausting its fruitfulness, but to preserve and increase it; not merely to make it yield him food, raiment and shelter, but to adorn it with shade, and fruits, and flowers. Let it furnish him, as it may, with a habitation which shall become more and

more attractive to himself and his family as they advance in life, and the thought shall become more and more grateful to him and to them, that they will sleep together, at last, upon its quiet breast.

Of one thing observed in this town, (West Roxbury,) we cannot forbear to speak, though it be only to record the fact, for an example to others. We allude to the lively interest and zeal manifested in the welfare of this society. One of the gentlemen, to whose attentions the committee were particularly indebted, assured us of his purpose to add, this year,—as he had done in former years,—a large number to the society's catalogue of members,—an assurance which he made good by the presentation of thirty names of new members, together with the fees for their membership. Another of these gentlemen had also warmly interested himself in a similar undertaking, which he nobly completed, by adding eighteen names to the catalogue of members, and passing to the treasury the fees for their membership. Now, allowing all the abatement which needs be made, for the peculiarly favorable locality where these efforts were put forth, we would urge it upon the consideration of every member of the society, how much may be accomplished by equally zealous endeavors elsewhere.

An instance of agricultural practice, hitherto unusual in this vicinity, was observed in Franklin, which, it is thought, may lead to profitable results. We refer to the spreading of fine gravel, three or four inches deep, as a top-dressing, on *uplands*, by which astonishing effects were produced on crops of grass and corn. The land on which this experiment was shown to the committee, had a subsoil of clay, and the benefit of such a top-dressing was supposed to consist, mainly, if not entirely, in warming the soil and thus quickening the growth of plants. It was affirmed, however, by others, that this was only a subsidiary effect of the practice; that the land was not particularly moist or cold, and that equally remarkable effects were to be seen on other and drier lands. But of the philosophy and particular benefit of this practice, we shall be able to speak more clearly hereafter.

CHARLES C. SEWALL, *Chairman.*

Statement of Mr. Motley.

The Bussey farm, occupied and managed by the subscriber, contains three hundred acres of land, various in character.

The largest crop is hay. This season we cut about one hundred and eighty tons. Had under the plough, as follows:—

Eleven acres winter rye—yielding three hundred and ten bushels. My plan in raising rye, is to take a piece of grass land which requires ploughing up, and in August, after taking off the hay and ploughing, seed down with rye, one bushel and a half to the acre, harrow and roll, without any manure. In this way, I get from twenty-five to thirty bushels per acre, and a good crop of straw; and my land is in good condition to receive manure for a corn crop, the following year,—the old stubble making the land when ploughed, remain light.

Five acres corn, which owing to the cold and wet early in the season, proved a failure, yielding only forty bushels per acre. The variety planted is the Bristol or smutty white. Heretofore, I have raised from eighty to one hundred and seven bushels per acre. Four acres in ruta-bagas, sugar beets and carrots, yielding 1,016 bushels ruta-bagas, 771 bushels carrots, 278 bushels sugar beets, making a total of 2,065 bushels.

I have been very unfortunate in the potato crop, for the last five years, invariably losing from a half to the whole crop.

This year I planted only one acre to Davis seedling, and the result was a total failure, saving only about twenty bushels, which sold early.

My neat stock is of the Jersey breed, either full blood or grade. I raise all my full blood calves, and all the grade heifer calves. We make, on an average, about fifty pounds of butter per week.

In raising calves, after having tried the different plans suggested, I prefer to take them from the cow on the third day and then give them new milk, warm from the cows, morning and evening, in such quantities as is necessary to keep them growing well, until they are ten to twelve weeks old, and then put them to pasture. The first winter, feed them well on good hay and a peck of ruta-bagas per day. Put them to the bull at fifteen months old. My stock consists of one bull, twenty-four cows, heifers and calves.

I have a small flock of sheep, of the Oxford Down breed, consisting of one ram and sixty ewes and lambs. I consider that I can keep a flock of two hundred and fifty sheep, on a farm like this, to advantage; and I would here urge upon the farmers of our county to use all their influence, at our next session of the legislature, to have the present dog law carried into force, or to procure another, more stringent, to be passed; for they must all be aware that the number of useless curs far exceeds the number of sheep in this county.

My breed of swine is a cross between the Suffolk sow and Essex boar, which I consider the best, for all purposes, I have ever raised.

I winter, in addition to the above, on an average, about twenty horses, which are fed on hay and carrots.

My manure is mostly kept in barn-cellars, is thrown over frequently and loam is mixed with it. Large heaps are closely packed up during the autumn and winter, on the fields where it is to be used in the following spring, and kept covered with earth, to prevent the escape of gasses and to protect it from the rain.

The grass fields are renewed every seven or eight years, and then kept under the plough three years. First year, winter rye, without manure; second year, corn, with ten cords manure as it comes from the cellars, per acre; third year, roots, with about six cords manure, then seeded down, generally in the spring, with one bushel Timothy and two bushels redtop per acre, well harrowed and rolled with a heavy stone roller—picking off the stones clean, and making it as smooth as possible for the mowing machine.

My milch cows are fed on rowen, as long as I have it, with one peck of carrots per day; then good hay and same quantity of roots. If my roots give out, I then give six quarts shorts per day—rarely any meal. I milk them, if possible, up to about thirty days of their calving.

I grind up all my corn on the cob, with one of the "Little Giant" corn crushers. A man and a pair of horses will grind, easily, fifteen bushels per hour; and this can be done in stormy weather, when it is impossible to work out of doors.

Woodland Hill, December 10, 1858.

Letter of Mr. E. W. Robinson to the Supervising Committee.

Gentlemen,—I have had considerable experience in reclaiming low lands, where rush and wild grasses were the principal growth, and my usual practice has been as follows: If the slope of the land was only moderate, I ploughed it by back furrows, into beds varying in width from two to five rods, so as to make a good ditch where the dead furrows came together. I then rolled down the furrows, spread the manure, and harrowed the ground thoroughly. After this preparation, I sowed about half a bushel of Timothy seed with an equal quantity of redtop, and covered it by using a bush or brush harrow. I then picked off the stones and rolled the ground again. When this was done in September, I could reasonably expect a good crop of grass the next summer.

Where the slope of the land is such as to allow the water to pass off freely, I have usually dug a trench two or more feet deep, laid a drain eight or twelve inches wide, and covered it, partly with small stones, and partly with loam above them. I prefer this sort of ditch wherever it will answer the purpose. The cost of one will depend very much on the nature of the soil through which it is to run. In some cases it may be made by using a common plough, attached to the hind part of a cart, so as to let one wheel run in the ditch.

My land has a clay, gravel or hard-pan subsoil. Water remains on its surface quite late in the spring. I have been accustomed to plough greensward in August or the latter part of July, with a Michigan double plough, which I consider the best plough for such use. I then spread manure and sow turnip seed, or harrow the ground, and suffer it to lie until the next spring, when it is ploughed crosswise, and prepared for planting. In breaking up land I plough nine inches in depth. For ploughing crosswise, I use the Connecticut River Valley plough—formerly sold by Prouty & Mears, or the sod plough, (letter B,) sold by Nourse, Mason & Co. I prefer for all kinds of ploughing in my land, a large sized plough. It stirs the ground much more thoroughly, and to a greater depth.

In preparing ground for any early crop, I like the practice of ploughing in coarse, green manure, in the fall. Land prepared in this way will become dry much earlier in the spring, and

besides the advantage of having the work of ploughing and manuring done in the fall, the work of planting may be attended to many days sooner than otherwise.

Rotation of Crops.—It has been my custom to plough the land in the latter part of summer, or after harvesting a crop of hay, and to plant potatoes the next spring. Then in the fall, I plough in green stable manure, and in the following spring plant peas, cabbages, parsnips, carrots, or some other root crops. If, when these crops are removed, I wish to lay down the land to grass, I sow in the fall winter rye and grass seed, at the rate of four or five pecks of rye with a half bushel each, of Timothy and redtop seed. I then pick off the stones, and roll the ground with a heavy roller. If any sods or bushes remain about the fences, they are carefully removed.

I commonly use clear manure, at the rate of eight cords per acre, at each time of planting, but none at the time of sowing grain or grass seed. When grass seed is to be sown in the spring, I sow with it barley. Wheat and oats do not fill well in this locality.

I have not been in the habit of using much manure for top-dressing, preferring to invert the sod and seed anew, after manuring, if the field is to be kept in grass.

My usual practice has been to plough greeensward nine or ten inches deep; old ground, for planting or sowing, six or eight inches.

For some years past, I have raised early potatoes, by putting the tubers into beds of manure about the first of April, and transplanting them with care about the first of May, putting into the hill some well-rotted manure. The ground is prepared however, the preceding fall, by ploughing in coarse manure. The potatoes are hoed about one week after being transplanted, and again within ten days afterwards. The crop averages about two hundred bushels of good merchantable potatoes. They will be early ready for the market, be more likely to escape the rot, and to sell for a good price. White Chenango potatoes are the best variety for the Boston market.

Early peas, for the market, are generally a good crop to raise. Select good seed; this is very important. Plough as soon as the ground can be furrowed in the spring, putting in manure which has been thoroughly forked over and commenced heat-

ing. Use the manure freely, and plant about a bushel of peas to the acre. After hoeing the peas a second time, plant in the rows either marrow squashes or sweet corn. When the peas have been picked, pull up the vines and hoe and cultivate the corn, if that was planted as soon as possible, and you will have it in season for the market before any frost can injure it.

Parsnips yield another good crop, when made to grow well. Their seeds do not readily vegetate. I have usually prepared the ground for them, and also the seed, in the following way: I plough the ground to the depth of ten or more inches, putting in at the same time at least ten cords of manure to the acre. I soak the seeds for twenty-four hours in milk-warm water, skimming off all that rise upon the surface, and roll the rest in pulverized plaster. If the seeds are good, they will then be sure to vegetate. Deep, heavy loam, near low land, is to be preferred for parsnips. Proceeding in this way, I have grown upon half an acre of ground, one hundred and twenty barrels of good merchantable parsnips, most of which were sold for $1.50 per barrel, and some, in the spring, for $2.25. They were harvested by running a large plough closely to the rows and pulling the roots up by their tops. I consider the above, however, an extraordinary yield, and the cost per barrel I am unable to state exactly. Parsnips afford good food for stock or swine. I have fed store pigs with raw parsnips in the winter season, giving no other food, and found that the pigs throve well.

Land which produces good corn, I consider best for grass. Good crops of grass may, indeed, be produced on low grounds, too wet for corn; but the quality of such grass cannot be so good as that grown on dryer land.

I think the best time for cutting grass is when it is in full blossom, should the weather then be suitable. With proper care two tons per acre may be harvested. I use only the scythe in mowing, and rake the hay with a horse-rake, saving thereby full one-half the labor.

It has been my custom to employ native workmen. I think they are the most skilful; they understand more readily and execute more rapidly. I usually employ five men for eight months in the year, and have endeavored to obtain men of rugged constitution and of good moral character. I treat them

like men, and in almost every instance, if I wanted one to perform any labor at any hour of the day or the night, I had only to make the request. Or, if I wished at any time to accomplish an extra amount of labor, for a day's work, I have seldom failed to do it.

The average wages I have paid for five years past, has been $15.50 per month, and all whom I have hired have been ready to commence work at sunrise and to continue it till sundown, or later, if necessary.

DORCHESTER, November 10, 1858.

PLYMOUTH.

From the Supervisor's Report.

We would see every freeholder making improvements on the homestead. A few days' work annually in removing stones and brush, in transplanting trees and fences, will add much to the beauty and pleasantness of home. The children catch the inspiration, and each one is eager to do something to forward the enterprise. Their taste is improved, their energy quickened, and they become more social, more active for study and for labor, more attached to home.

It becomes us to inquire, whether as an agricultural community we are not falling behind the rest of the world by our neglect of improvement when we ought to be in the advance. Do we not think too much of the bushels of grain which we can raise the present year, and not aim enough at the general improvement of the farm? Such improvement as shall render home attractive and pleasant to our young men, and save them from the inclination to leave the paternal roof for those pursuits which insure failure and disappointment to so many.

Our farms are capable of both productive and ornamental improvement. Would it not then be advisable for the agricultural society to give more encouragement to farm improvement, by offering a higher premium for the best conducted farm,—for converting swamp lands into English meadow,—and old worn-out hills and fields into forests? The entries made for such improvements for the last two or three years have been very few.

One entry was made in 1856, for premium on the best conducted farm, but within two years from the time the gentleman sold his place and went into other business. No entry has since been made for this premium.

One tree association only was entered for the society's premium offered the present year. We are sorry to find no more competition for this premium. Many individuals in the county have manifested a laudable ambition for improving the appearance of their neighborhoods, and have transplanted numerous ornamental trees about their buildings and by the highways, which in a few years will add much to the comfort and beauty of their homes. It is hoped that others will follow the example, and either as individuals, or by uniting together under a constitution as an associated body, extend these labors and improvements till all our public streets and highways shall be bordered with fruit and shade trees.

F. P. HOWLAND, *Supervisor.*

RECLAIMED MEADOWS.

ESSEX.

Statement of William Osborn.

The meadow I offer for a premium is the same which was offered in 1855, with the addition of about one acre since reclaimed. For the expense of reclaiming, I refer you to the report of 1855. Of the expense of labor, and the crops since that date I am not able to make a satisfactory report, as it is so connected with the land on which you saw the rye; I can only say that the crops were abundant, and the most profitable investment that I have ever made in farming. The crops of this season were nine one-horse wagon loads of hay of the first and second crops; ninety bushels of carrots from thirty-five rods. Of the potatoes I cannot give you the amount as they were dug while I was from home, and I neglected to have the account

kept of them; aside from the rot there was a fair yield. I do not hesitate to say that on the most part of that in grass there were over two tons to the acre, and if I ever saw three tons to the acre it was there. It was with the greatest difficulty that we could make it on the land.

My method of raising carrots is to spread the manure on the land early in the season and plough; let it lay until the weeds start, then plough again, and sow the carrots with cabbage seed to mark the rows. As soon as they are up, go through with the scuffle hoe, and weed shortly after. It is but little trouble to keep the weeds under till the carrots cover the ground, provided you bestow the labor at the right time. I consider them one of the best paying crops that I raise.

I find seventy-five and one-half days' labor charged to the orchard, as I designate the whole land embracing the swamp land of about three acres, and about the same of the higher land on which you saw the rye. The land on which I had rye is about one-half sown with wheat, grass seed and turnip, and the remainder in clover of fine growth. I consider the improved condition of the land equivalent to the cost of manure, of which in my estimation I have made no account.

LYNN, October, 1858.

MIDDLESEX SOUTH.

Statement of William F. Barnard.

Gentlemen,—The piece of meadow land which I offer for premium, contains about $2\frac{1}{4}$ acres. I commenced operations upon it in 1845. The land is nearly level, being but a few inches the lowest in the centre. The water stood a part of the year on the surface, and in the old ditches, which had been cut some time previous to my purchasing the farm in 1835. The grass that grew upon the land was of the poorest quality, and nearly worthless. The yield was also small, not more than a ton a year from the whole lot. The land I considered worth but little in that condition. But hearing of experiments made by others in "reclaiming bog meadows," I decided to commence upon mine at once, believing that if I did it no good, I should

be safe in one respect, I could do it no harm. Being convinced of the necessity of draining the land before it could be converted into good English mowing, and having ascertained that the fall was sufficient for all practical purposes, being about eighteen inches to the twenty rods, I commenced cutting ditches. The only outlet for the water is through adjoining land below mine, belonging to my neighbor. Having obtained his consent, I cut a ditch through his land to the main stream, about fifteen rods, to connect with the ditches through my land. The first ditch I cut around the outside, about two feet wide, and from two to three feet deep, according to the depth of the mud. The object was to take the water from the high land and springs on the outside. The other ditches were dug through the lot, parallel to each other, about three rods asunder, and from three to six feet wide, and from four to six feet deep, unless troubled with water. My object in digging that width and depth, was to obtain as much of the material for covering the land as I could, from the ditches, which consisted of mud three or four feet deep, and a sub-soil of sandy loam. I commenced on half an acre in August, 1845, by cutting and throwing out from the ditches, until I had, by estimation, 150 loads. As I used about 100 loads to the acre, I had some to spare on other parts where the mud was not so deep. I commenced spreading on one-half acre in September following, covering up all vegetable matter, carting on at the rate of 20 loads of compost manure to the acre. The proportion of seed sown on an acre, was Timothy one peck, redtop three pecks, four pounds clover seed, in the spring following. In June following, another half acre was prepared in the same manner.

I consider June seeding on such land the best, as being less liable to winter-kill. I continued my improvements in June, 1847, on another half acre, in the same manner, and with the same results, and completed the remainder in 1848. About one-quarter of an acre was prepared by carting on gravel and loam from a distance, but it was more expensive than the other method. It could be done in winter for about the same price, when the ground is frozen and the price of labor less. As some of the ditches I have dug will not be wanted, I am filling them up by depositing the small stones in them, as I gather them from the fields, thus serving a twofold purpose, for the

water to drain off, and the convenience of passing with the team from one lot to the other. I estimate the expense, per acre, in preparing the land in this manner, at $25.

The annual yield of hay, per acre, has not been less than two tons. I give it a light top-dressing every year; and whether the season is wet or dry, hot or cold, I have about the same yield. I consider it the most profitable land for grass I have on the farm.

MARLBOROUGH, September 1, 1858.

NORFOLK.

Statement of Henry L. Stone.

Three years ago I commenced improving a meadow of six acres, mostly a peaty bog, covered a large portion of the year with water, and producing a few brakes, cranberries and coarse grass. About half an acre of it had been dug over for peat two spits deep. I first dug a drain sufficiently deep, from the centre, to take off the water, two and a half feet below the lower portion of it. Then put in cross drains, from one and a half to two feet below the surface and leading into the first or main drain, and fifty feet apart. I used the six inch horseshoe tile double, for the main drain, thus ⊂, and single three inch for the cross drains, laying the single tile on a board when the ground was soft, thus __∩__, which have, so far, answered the purpose. I then proceeded to pare the turf or top sod, which I used to fill up the peat pits to the extent of one-fourth of an acre, the balance I have burnt on the ground, with good results to succeeding crops. I have thus reclaimed about four acres, at an expense of $513, or about $123 per acre. A portion of this outlay for the main drain being for the benefit of the whole, should be charged to the remaining two acres; so that I think the whole may be reclaimed for a sum not exceeding $100 per acre. I have planted on that part reclaimed, potatoes, corn, turnips, carrots, mangold wurzel, parsnips, squashes, and pumpkins. These crops have, in no case, paid any thing more than the cost of cultivation the first season. The second and third seasons they have proved profitable, yielding, with but

little manure and ordinary cultivation, and twice hoeing, as follows:—

Indian corn, at the rate of 78 bushels per acre.				
Mangold wurzel, $17\frac{1}{2}$ tons, or 580 bushels per acre.				
Carrots did not come up well,	220	"	"	"
Potatoes, ...	160	"	"	"
Ruta-bagas, . . .	230	"	"	"
Flat turnips, . . .	315	"	"	"
Pumpkins, . . .	12 tons		"	"
Parsnips, ...	60 bushels		"	"

The above were all of good quality, except the parsnips, which were each a mass of fibrous roots of little value. The land is now in fine productive condition, and I consider it, for ease of cultivation and productive quality, worth at least three times as much per acre, as any other land in my neighborhood. I have omitted to mention, that I did not surround the meadow with a marginal drain until the second year, therefore did not get full control of the water, and thereby lost the product of the first year by an inundation, caused by the autumnal rains. I feel confident that it is useless to attempt to cultivate such lands until they are thoroughly drained, and this can only be accomplished by surrounding the land with marginal drains, of equal depth with the main drain, thereby cutting off the springs and diverting the water thus from the surrounding high lands. If this is done, I feel confident that the crops, whether of corn, or roots, will, after the first year, or after the land shall have been ploughed and been exposed one winter to the action of frost, pay good interest on the investment, to say nothing of the happy consciousness of being a public benefactor; for if he is such who "makes two blades of grass grow where but one grew before," what should be said of him who covers the meadows with grass where none grew before?

GRANTVILLE, November 10, 1858.

IMPROVEMENT OF PASTURE LANDS.

NORFOLK.

Report of the Committee.

The Committee on Improving Pasture Lands, in submitting their report, with the accompanying exact and intelligent letter of Mr. Gray, are happy to say, that they have had an opportunity at last to bring the subject of improving pastures to the notice of the members of the society. "Whether," to use the language of Mr. Gray, "the renovating of this pasture will prove a profitable operation, remains to be proved." Yet he can safely say, it will pasture *four* cows now, where it would *two* before. This fact is worth something, and should Mr. Gray's example be followed generally, a similar result would certainly be productive of much good to the community. To what extent these improvements can be made on large farms where capital is not plenty, and unimproved acres are far too numerous, the committee will not decide, neither has there been a sufficient experience to settle, whether the wood lot, or the pasture, is better for the owner in the long run; but, certainly, on small farms, and where there is pecuniary ability, many an unsightly spot, overgrown with brushwood and briars, would be well changed into food for cattle. Two results strike the committee as following the improvements under consideration. One is the fact that a larger number of cattle can be fed on the same land; and the other, that the quality of the food will be improved. In our ordinary pastures five or six months of feeding is all that can be profitably obtained, and that, too, with additional feeding from the barn, especially if the milk is sold in the market. Suppose that our pastures should be made as rich as our mowing lands, should we not be able to extend the pasturage season, save the fall feed in our mowing fields, the feeding of the latter being considered by many good farmers a poor plan; and would not the milk be richer and sweeter than it often is, as the cows would have only the good grasses to eat? The committee trust that Mr. Gray's example will call the attention of farmers to their pastures, and that this

society will have the experiments before it with an approach to the real value of the improvement. The committee do not propose to discuss this matter at greater length, preferring to wait until more facts shall come before them.

BENJ. G. KIMBALL, *Chairman.*

Statement of Smith Gray.

The two pastures visited by you contain about sixteen acres; they were both in one, when they came into my possession, twenty-two years ago. At that time the fences were poor, and the pasture pretty well covered with bushes and moss, and I may add, remained in the same condition till 1850. In the spring of that year I ploughed up about two acres of the best part, and had it planted with corn and potatoes, and the same course was pursued with it the following year. It was laid down to grass in the spring of 1852. In the same spring I had about nine acres more ploughed up, but being a mile and a half from home, it was determined to adopt some other method than hauling the manure that distance. Buckwheat was accordingly sown on the nine acres, and two green crops were turned under that season. The next spring spread on a few bushels each, of ashes, plaster and lime, and sowed it down to grass; a great portion of the pasture, after ploughing, was covered with large quantities of loose stones; in order to get rid of these, and at the same time turn them to some account, a trench was dug and they were carted off and made into a wall around the lot, by "doubling up" about two and one-half feet thick and two feet high, setting the old posts in the wall and two rails above; the same kind of fence was also made *across* the pasture, to divide what had been already ploughed from that which had not; this portion, that is the remaining five acres, being decidedly the poorest soil and roughest part of the whole, it was concluded at that time to let it lay as it was. However, in the fall of 1854, I employed a man, with one yoke of oxen, to assist my hired man and horse to plough up the five acres; and though it was very poorly ploughed, on account of the quantity of loose stones and bushes, yet I had to pay for the man and oxens' part of the labor twenty-six dollars.

The three succeeding seasons some of the best patches in this lot were planted with corn, beans and potatoes, (mostly the latter,) the rest of the piece was ploughed once, and harrowed two or three times at odd jobs, each season; the stones being picked and carted off for making wall, after each harrowing. It was estimated that the crops of potatoes &c., taken off, about paid for labor and seed on the patches which were planted. In the lowest part of the pasture was an old pond, a receptacle for the washings from the land, doubtless from time immemorial. During the drought of the summer of 1855, all the mud was taken out of this pond and lay in heaps through two winters and one summer to pulverize, turning it over once in the mean time, by hauling it on to the upper end of the pasture where I wished to use it. In the spring of 1857, one-half of this mud was mixed with Turk's Island salt and twenty casks of lime (slacking the lime with a saturated solution of the salt) and the other half was mixed with about ten tons of residuum from a soap boiler's establishment in Boston. Early in the fall the two heaps were turned over, the better to mix the ingredients together, and the five acres were ploughed and harrowed once more, and another large crop of stones picked off by boys during school vacation, and to their delight it was finally decided that that it was ready to sow down with grass and grain. Before sowing, super-phosphate of lime was spread on to half an acre at the rate of four hundred pounds to the acre. The remainder was divided into three equal parts, on one of which was sown clear Turk's Island salt, at the rate of fifteen bushels to the acre; on another the compost heap of salt, lime and mud, and on the other the mud and soap boiler's residuum. After harrowing in, it was all sown with grass seed, and about four acres with winter rye also. The rye came up well and pretty uniformly. It was the stoutest where it received the super-phosphate of lime. The grass seed appears to have taken well, except on the driest knolls and one low place which was covered with water late in the spring. On the four acres I have forty bushels of rye, and estimate two tons and a half of rye straw.

Whether, on the whole, the renovating of this pasture will prove a profitable operation, remains to be seen. All we can say now is, that in 1850 it was a very poor pasture, mostly covered with bushes and moss and very poor fences, with all the

attendant annoyances; and now in 1858, it is a pretty good pasture, with substantial fences, and I think I may safely say that it will pasture four cows decidedly better now, than it would two before.

WALPOLE, Sept. 27, 1858.

UNDERDRAINING LAND.

ESSEX.

Report of the Committee.

Notwithstanding the very great benefit to be derived from a judicious system of underdraining our wet, and necessarily cold lands, and the very liberal encouragement the society has offered for several years past, for experiments in this substantial operation, very little has yet been accomplished in the county of Essex, in this branch of industry. We have the satisfaction, however, to report, that this subject is receiving increasing attention; that a very considerable number of our substantial farmers are taking the incipient steps in this direction, and we confidently predict, that the next five years will witness results from this method of improving our hill tops, as well as our valleys, which at the present time we should hardly anticipate.

Two applications have been made for the premiums offered by the society for experiments in underdraining, the present year. The claimants are James Stevens, of North Andover, and E. G. Kelley, of Newburyport. Both pieces of land have been examined by two members of the committee. The piece of land offered by Mr. Stevens, containing about two acres, was formerly—as will be seen by his statement herewith submitted—unproductive and nearly valueless. The land is nearly level, the inclination being so slight that the water must necessarily escape at a very slow rate, even through a perfect water-course. We should not therefore, under such circumstances, expect to find the result of the experiment so marked, as we should look for on a greater declivity. Still, the committee feel that in awarding premiums offered by the society, for experiments of

this nature, they should be fully satisfied that the object aimed at had been fairly reached, and in no way can this be so fully demonstrated as by an exhibition of the crops actually produced upon the land for which a premium is claimed. That Mr. Stevens has greatly improved the land by the series of drains he has laid through the same, is evident from the fact that this is the first year he has been able to work it at all. We however consider the experiment incomplete. The crop of barley raised upon the ground the present year was unsatisfactory, and the grass, on land so richly manured, did not look so promising as we could wish to see it. We are far, however, from pronouncing the enterprise to be a failure. Our greatest fear is, that drains lying so nearly level, will easily become obstructed, and thus disappoint expectations. We shall be happy to learn that our fears are groundless. We only regret that Mr. Stevens had not postponed his application till another year. Should his anticipations be then realized, he would present a strong claim for a premium. With the views as above expressed, your committee do not feel justified in awarding a premium to Mr. Stevens for his experiment in underdraining. Mr. Stevens' mode of putting down his drains, (as very fully shown in his statement,) is we think judicious, and probably the best method he could adopt for land thus situated.

The land offered by Dr. Kelley, containing about five acres, lies on the westerly side of High Street, in Newburyport. We might say much of the beautiful evergreens and shrubbery with which these grounds are ornamented, but as we are not a committee on landscape gardening, we will return to the ditch.

The land which the doctor has underdrained, is admirably situated for the operation. The largest portion of it lies upon a sharp declivity, and the inclination is so great on any part of the land, that the water passes through the drains with considerable velocity.

The work we think is well done, and with the almost certainty that drains thus situated will not become obstructed, we may add, permanently done. For the method adopted and materials used in this operation by the doctor, as well as for several valuable suggestions in regard to the utility of the enterprise, we refer our readers to his full and somewhat elaborate statement which accompanies this report. The committee

passed over the entire grounds through which the drains had been laid, and found the surface uniformly dry and friable, and in a good condition for the cultivation of almost any crops we usually raise. The crops remaining upon the ground, (the largest portion having been previously harvested,) looked well.

We noticed a very fine lot of carrots and a patch of corn which was very good. This corn grew near the base of the hill, on a comparatively flat piece of land, where corn was never seen before. Our attention, however, was more particularly directed to a very fine pear orchard, occupying, as we should judge, some one and a quarter acres of this underdrained land, and here we think the doctor will witness the most gratifying results, and reap the greatest benefit. If our memory is correct, there are now standing on this lot about four hundred pear trees, comprising most of the choice varieties; and we can truly say, we never saw finer trees, or a more healthy and vigorous growth. Certain we are that such trees could never have been produced upon this land in its original condition, for nothing can be more fatal to the growth of the pear tree, than stagnant water about its roots. We confidently predict that in five years from the present time, this pear orchard alone will pay the doctor a good interest upon his entire outlay for underdraining.

Your committee feel so well satisfied with the results already attained by the underground operations of Dr. Kelley, they most cheerfully award to him the highest premium offered by the society (twenty dollars).

Some of the most valuable farms in the county of Essex are situated on the summits and declivities of the hills in West Newbury, Andover, Haverhill, Georgetown and Topsfield. These farms are generally wet, backward lands, and cannot be worked in early spring, subjecting the owner to the necessity of cultivating mainly the various grasses. Now as man cannot live on grass alone, we would suggest to the proprietors of such farms, to try the experiment of underdraining one acre at least, that they may have the satisfaction of regaling themselves as early as the fourth of July, with peas, potatoes and other vegetables raised in their own garden.

W. N. CLEAVELAND, JESSE SMITH,
Committtee on Underdraining.

Statement of E. G. Kelley.

I offer for premium about five acres of land underdrained during the last five years, a portion each year. The drains commence on a declivity, and are made for some distance with brush wood, then with stone, till the land approaches nearer to a level, when tile were used exclusively. About one-half acre each, was drained with brush and stones, and both have worked well; but we do not advise the use of either when suitable tile can be conveniently obtained, particularly if the expense of labor, difficulty of adjusting materials, and confidence in their future successful operation are duly considered.

The drainage of the lot has not only proved entirely satisfactory, but each successive year the first drained land has given marked evidence of the utility of underdraining as an annual improver of the soil, in addition to its immediate benefits, which the committee will readily understand by a moment's reflection upon the comparative effects of freezing and thawing clay subsoils underdrained and undrained. In the former, the expansion by freezing leaves both soil and subsoil in a lighter and more pliable condition after thawing; while the latter, become more tenacious, like mortar, more or less so to the depth frozen. The frost, however, we have observed is not so deep in the drained as in the undrained.

In view of this yearly increasing benefit to underdrained land, by these natural processes, we have many doubts of the expediency of subsoil ploughing clayey land, after draining, so often recommended, a matter to which we have given some attention. One acre of the above has been trenched two and a half feet deep—the drains running one foot deeper—three-fourths of which acre was the only part of the five which had not a clay subsoil.

It is gratifying to be able to cultivate this drained land almost as soon as the frost is out, rather than to wait as formerly, till a dry spell would, by degrees, evaporate the surface water, leaving a hard crust on a cold under-soil, previously to which it was difficult getting about on the field. The improvement in this respect is very evident compared with a lot drained by open ditches, for want of sufficient outlet; but the contrast is still greater by the side of an acre more elevated and hitherto the

dryest, and supposed not to need draining at all, but now so wet comparatively, as to require to be underdrained forthwith.

We have made in the lot entered, 8,910 feet of underdrains, on an average more than three feet deep and twenty-five feet apart, at an estimated expense of nearly seventy-five cents per rod. The brush used was the trimmings of an old orchard on the premises, which were crowded into the open ditches and forced down to a foot in depth and covered with boards, salt hay, or sods, before filling in. The stone drain consisted of small stones collected by trenching and cultivation elsewhere, and thrown in generally to the height of eighteen inches and covered uniformly with very coarse gravel, abundance of which was at hand. On the joints of the tile, pine shavings were freely used, and old shingles over many of these; but if tile are made to fit well to each other, we are satisfied that nothing whatever should be placed over the joints or next to the tile but the clay itself, taken from the bottom of the ditch. The imperfect tile, as yet in the market, greatly disappoint those engaged in underdraining. We obtained the most perfect we have ever seen, from Albany, N. Y., made with double sole—a sole on opposite sides—admitting of four different positions in laying, one of which would generally fit the tile previously laid.

Of the improved productions noted from year to year, our statements might seem incredible to those who have not seen the crops, we therefore forbear.

The indirect fertilizing results of thorough drainage are apparently of more service to crops than common manuring on wet undrained land; but when fertilizers are applied in addition to those absorbed from the atmosphere, rains, &c., by the well drained and porous soil, the effect is truly gratifying.

Newburyport, September 27, 1858.

Statement of James Stevens.

Five years ago I commenced cutting a drain on a cold, wet and flat piece of land, which had for many years been planted occasionally, and then sown down to grass. Sometimes we would get a few fair crops, and then a kind of sour, round grass

would come in and the crop would be very small and of a very poor quality.

The first ditch was cut three feet wide at the top, and two feet wide at the bottom. It is two and one-half feet deep and thirty rods long. In order to carry the water from this ditch, I cut a drain forty-five rods long. This drain had to be cut through a small elevation of land, and then came to the low land. The drain continued through the low land to an outlet. The drains are stoned, by placing stones on the sides of the ditch and then covering them with as suitable stones as we could find from the loads drawn there. On the covers we threw small stones, and after having strewed meadow hay over these stones, to prevent the dirt from going through the crevices, we threw in as much of the original soil as we could.

The next year another drain was cut, and stoned as above. These ditches have taken the water from the land, so that I have been able to cultivate the land to much better advantage than before, and consequently have obtained large crops of hay of the very best quality.

I now come to land which for many years past has been so covered with water as to render it almost impossible to cultivate it. The crop consisted of wild grass and brakes, which of course were of small value.

Three years ago I ploughed the land in August, in a very dry season, but the two following seasons it was not dry enough to plant any kind of seed. Last year I commenced cutting ditches through it, and fortunately there is fall enough to enable the drains to carry off the water. These ditches are dug two and a half feet deep, through the soil and subsoil, and about eight inches into a hard pan or clayey substance, through which the water could not penetrate, and consequently has stood upon the surface of the ground, hitherto baffling all my attempts at cultivation.

Ditches one, two, three, and four, empty into the receiving ditch which has an outlet at both ends. This year I have been able to work it, and have laid it down to grass. The crop of barley which I cut from the land this season, was not large, as it was sown late, but the clover and grass looked remarkably well. The stones were all picked off, and the land rolled very smooth,

and I feel confident that from this field of about two acres which, for many years back, has been of little or no advantage to me, I shall obtain crops of hay equal both in quantity and quality to those taken from the best piece of land of similar size on my farm.

In reference to the expense, I will say the ditches are stoned and covered in the same manner as those before mentioned, with the exception of the receiving ditch, which I shall cover at some future time. The ditching was done by my men who work on the farm, whenever they could get time, therefore I am unable to give the exact cost. My opinion is that the expense is about one dollar per rod, the way I managed.

NORTH ANDOVER, September 28, 1858.

NORFOLK.

From the Report of the Committee.

In the "Agricultural Journal," published in Edinburgh and in London in 1857, a journal considered of high authority,—we find an elaborate review of Mr. Stephens' book, "The Yester Deep Land Culture, being a detailed account of the method of successful cultivation practised for years by the Marquis of Tweedsdale, at Yester." From this source the committee take leave to extract one or two paragraphs, as germane to the subject in hand.

"Mr. Stephens informs us that since improvements were begun at Yester, in 1832, he has had many opportunities of witnessing all the different operations put in practice; and early impressed with their importance as the foundation of a mode of farming so very different from what is in ordinary use, as to merit the appellation of a *new system.* He viewed them from the first with a high degree of interest. A more distinct and lucid statement—one which conveys more readily to the mind of the reader a clear conception of the whole case, we have seldom happened to peruse, while the scientific bearings of the subject are treated in a manner which leaves little to be desired." The Yester mode of cultivation, as far as it has the character of an original process, may be expressed in a few words. It is a

method of breaking up and pulverizing the subsoil to a considerable depth, and then raising it upwards, so as to mix it, in any required quantity, with the surface soil; and this it effects by means of a subsoil trench plough of a peculiar construction. But its chief merit is not seen by regarding it simply by itself; it admirably adapts itself to the other great ameliorating processes to which the soil is subjected, and renders them more complete. Assuming thorough draining as an essential prerequisite, it appears to be the only method hitherto devised, which on the one hand gives full effect to that operation, and derives from it all the advantages of which it is susceptible; while on the other it deepens and improves the plant-growing soil, and brings it into a condition which best fits it for benefiting from manures and atmospheric influences. It may be regarded, therefore, not only as an important discovery in itself, but also just such a one as was needed to give full effect to many of the most important improvements lately introduced into agriculture. This will appear more fully as we follow Mr. Stephens into some of the details with which his work furnishes us. It would exceed the limits of this report to do this, and the committee content themselves by recommending to those desirous of a more thorough knowledge of this subject, to possess themselves of Mr. Stephens' book.

With regard to the expense of this mode of culture, the same authority, after describing minutely the nature of the Yester lands, which seems to present as formidable difficulties to be overcome before reduced to regular cultivation as could be found in the most rugged of our New England farms, proceeds: "As the basis of all improvement in such a case, without which every other operation would have been impracticable or nugatory, the lands were first subjected to a system of thorough drainage. The drains were dug thirty inches below the bottom of the open furrows of the round ridges, which was equal to thirty-three inches below the level surface of the ground, and placed eighteen and thirty feet apart. The main drains were dug four feet deep, bottomed with horseshoe tiles and soles, having gravel occasionally placed above them; but it was found that the surface earth turned into the drain answered all necessary purposes. The drains placed widest apart, viz.: thirty feet, were found to drain the land sufficiently, especially

when followed by deep ploughing, by which the escape of the water is greatly facilitated. The expense of thorough draining, thus described, was £5 9*s*. 6*d*. sterling, or $27.50 per acre. The description of the subsoil trench ploughing follows, the expense of which is thus stated:—

	£	s.	d.
Four men and four pairs of horses ploughing an acre a day, ...	£2	8	0
Labor turning out and carting off stones, . .	0	5	0
To which add the above expense of draining, .	5	9	6
Making, ...	£8	2	6

or $40.50.

From the higher prices of labor with us, it is fairly to be inferred that the same quantity of work could not be accomplished here without a considerable addition to these items of expense. It is, of course, for every intelligent farmer to make his own estimates of outlay, and also of the results to be expected therefrom.

It is hardly necessary, as your committee believe, to inculcate caution upon our practical farmers; they possess that valuable quality to a healthy extent,—and perhaps in some, if not many instances, it retards substantial improvement. If, however, they are somewhat slow in adopting novelties, they are nevertheless sure of availing of well-tried experiments, the good results of which are no longer problematical.

THOMAS MOTLEY, *Chairman.*

From an Essay by L. Wetherell.

The arts of drainage and irrigation, are, undoubtedly, nearly as ancient as the art of agriculture; for there are few localities where one or the other, if not both, are essential to the husbandman and the gardener. The race of Spanish Arabs have the honor of introducing the art of irrigation into Europe, and thus rendering districts fertile and productive that before were barren. While the South of Europe previously suffered for want of water to moisten its parched surface, in the North the soil suffered with an excess of moisture; hence irrigation for the South and drainage for the North.

In reclaiming the earth to man's use, the first objects of his labor are the destruction of noxious and mischievous animals, the levelling of forests, the construction of habitations and the draining of morasses. This is the mission of the pioneer. The generations that follow have other and more important improvements to make, as the soil is annually impoverished by cropping.

In commencing the important operation of deep and thorough draining, the first thing to be attended to is, to provide deep and clear channels, into which the covered drains are to discharge their water. Unless such can be made it will be of little use to underdrain. The whole outlay of draining hinges on having good discharging channels. If the bottom of the main ditch, channel, or drains, brook or river, be scarcely below the bottom of the covered drains, they will be rendered almost ineffective. The main drain, or the one into which the lesser ones discharge, should be five, and if possible six feet deep, provided the former are four feet deep. Too much precaution can hardly be used in keeping these main drains free from all obstructions. Let these once become gorged and the whole will suffer damage.

But the advocate for deep and thorough drainage is constantly confronted by intelligent farmers— "What is drainage, and how or why is it so important, as you claim it is, to permanent improvements?" It is right that such questions should be put, and the advocates for drainage should be able to answer them and all similar inquiries, or else tarry awhile longer at Jericho.

The first reason or necessity for drainage is predicated of the supposition or fact, that the soil and subsoil are charged with an excess of water, rendering it impossible to produce maximum crops until it be removed. The first evil is mechanical. If the soil be clayey and tenacious the circulation of the air through it is prevented and it remains cold and sour, and is less productive. This complaint is made by the tillers of such land every cold and wet spring, because they cannot plant or sow; and if they do not withhold the hand by reason of the wet, in consequence of the stagnant water in the soil, it produces but a poor crop.

The words, *wet* and *cold*, are significant, thus applied. Evaporation is productive of cold, says the chemist, a fact the farmer knew before chemistry came to his aid. Evaporation, then, it will be admitted, lowers the temperature at the earth's

surface. It requires as much heat to evaporate a cubic inch of water, it is said, as would raise the temperature of five and a half inches from the freezing to the boiling point. To evaporate the fall of an inch of water from an acre of land demands an amount of solar heat sufficient to raise the temperature of the dry soil of an acre to the depth of ten inches, no less than ninety-nine degrees. Then when the fact is considered that forty or more inches of water fall annually upon every acre of soil, the importance of underdrainage, as a means of keeping up the temperature of the soil, cannot but be observed and acknowledged. Owing to radiation and other agencies, the difference between the temperature of drained and undrained land is not so great as theory would make it. Much of the heat is rendered latent—i. e., not perceptible by a thermometer. The vapor yielded by a cubic inch of water, evaporated under the ordinary atmospheric pressure of fifteen pounds to the square inch, contains sufficient latent heat to raise the temperature of nine hundred and ninety cubic inches of water one degree. A wet soil, then, that has no way of freeing itself of an excess of water, but by evaporation, will be cold for the reasons given, and the crop will be both later and inferior to what it would be, provided the soil was freed from this excess of moisture by drainage. Hence, also, the liability to injury from frosts, both late and early, over such undrained regions.

Soils impregnated with stagnant waters are bad conductors of heat from the sun downwards, and good conductors of cold. Thus is the heat absorbed by day, and radiated into space by night. Not so with well drained soils, for such retain it for the promotion of the growth of plants. Acids are developed by cold, wet soils, and other compounds, injurious to the healthful condition of growing crops. The mixing of the latest fall of rain with the stagnant water in the soil, causes a mutual decomposition, injurious to vegetable life, checking the growth and diminishing the amount of the crop. These are some of the evils incident upon an excess of water in the soil, which may be removed or cured by underdraining, provided there is sufficient fall.

By drainage the aëration of the soil is greatly promoted. The stagnant water being removed, the pores of the soil are open for the reception of atmospheric air, dew or rain-water.

The union of the elements where combination makes the atmosphere, coming thus in contact with the combined elements that make the soil, produces a change favorable to the growth of plants. This accounts for the increased productiveness of recently drained soil. Latent elements are thus fitted to become the food of the growing crop.

Rain-water is a natural fertilizer, provided it can circulate through and not stagnate in the soil. The introduction of water, says Liebig, is an introduction of alkalies. If so, then it is the cheapest liquid manure the farmer can seize upon. It not only fertilizes, but warms, and cleanses the soil from noxious and deleterious elements, carrying them into the drains, by which the power of soils to absorb aqueous vapor, whether in the form of dew or mist, is greatly increased and made much more productive.

Says Sir Humphrey Davy: "The power of soils to absorb water from air, is much connected with fertility. When this power is great, the plant is supplied with moisture in dry seasons; and the effect of evaporation in the day is counteracted by the absorption of aqueous vapor from the atmosphere, by the interior parts of the soil during the day, and by both the interior and exterior during the night." Soils most finely comminuted, if underdrained and deeply tilled, are most favorable to this action.

Thus it is shown what drainage is, what it does, and therefore, why it should be introduced especially into tenacious soils. It removes stagnant water, and renders the soil porous. It removes the sources of evil and is the occasion of good by opening the interstitial canals of the soil for the reception of air and healthful moisture.

If you would drain tenacious clay soils effectively, reference must be had to the season, as well as to the depth and nearness of the parallel drains, and the main or discharging drain. The best time is in the summer, when the weather is dry. The drains, after they are opened, should remain a few days before the pipes are laid, and the ditch refilled. Such soils are usually of greater intrinsic value than sandy soils, and require more skilful treatment to make them produce well, especially in the art of draining.

Concerning the depth of drains and their distance from each other, there are various views and opinions entertained by experienced drainers. These may be accounted for in part by the difference in soils. It is no more strange that this should be so, than that husbandmen should differ in reference to the depth of ploughing. Farmers are not generally informed as to the depth which the roots of cereals and other crops penetrate. It is said the smaller grains send down roots to the depth of three or more feet; and mangold wurzel four or five feet. All good arable lands should then be drained to the depth of three feet. To do this, the drains must be sunk four feet deep from the surface. The interstitial canals existing in the soil have been compared to tubes, the downward pressure being increased by the greater length of these. If the drains are shallow, the tubes short, the pressure will be less, thus draining more slowly. The truth of this doctrine is demonstrated by practical observation; for deep drains run sooner and faster after a rain than shallow ones. Hence the reason why deep clay soils require deep draining in order to render it effectual and beneficial. The theory of inexperienced reasoners on this subject is in opposition to facts. The theoretic objection to the deep drainage of clay soils is as good, theoretically, against shallow as deep drainage, which is, that the water will not percolate to the drain.

Before drains can become effective, either in deep or shallow draining, the pores and interstices of the soil must be emptied of the stagnant waters that have filled them. This requires some time. Where there are slopes or ridges on the surface to be drained, the drains should be run across these at an angle of forty-five degrees.

Drains that were sunk to the depth of four feet, after ten years, have been found six or seven inches nearer the surface than when the pipes were laid. Hence no thorough drainer should be content short of four feet in depth, unless there are physical objections to this in the soil or fall.

Many fail in constructing their drains too far apart. Mr. Parks, already referred to, did so. In very tenacious clay soils drains that are four feet deep should be from eighteen to twenty-five feet apart; if three and a half feet deep, from eighteen to twenty-one apart. On soils more porous, twenty-five to

thirty feet will do; if the depth be four feet, and on very porous soils, from forty to fifty feet will answer. This whole matter, however, must be determined on by careful inspection. Elkington's rules are said to be the best on this subject.

The use of tiles in thorough draining is becoming common in this country, as in England and France. Of all the various forms of tile for this use, the pipe-tile, so called, because in form resembling a pipe-stem, is considered the best by English drainers, because cheaper, less liable to get broken, and less likely to foul and stop.

The most serious objection made to this permanent improvement in farming, is its cost. To quote a vulgar, but significant phrase, "*It will not pay*," say the farmers. If this be true,—if experience and observation, after having given thorough draining a fair trial, shall confirm this prediction, then none but fancy farmers will adopt it; for all matters in farming that fail to stand this test must ultimately fail. All improvements which are in advance of old customs and traditions are assailed in this way by prejudice; consequently improvements of every kind make slow progress. And it would be strange, indeed, if the theory that nearly all arable lands in Massachusetts need underdraining, did not meet sturdy objectors, clad in economy, as with a coat of mail, earnestly and in good faith, contending that such a radical improvement will never pay. With such, the advocates of thorough draining should not spend much time in arguing the question, but rather in collecting facts, such as experience has evolved and observation confirmed.

Such are in the possession of every practical drainer, whether in England, Scotland, France, or the United States. Observation and experience have taught the writer that the whole cost of draining swamp land has been more than paid by the first crop of potatoes taken off after draining.

One of the best and most successful experiments made in thorough draining of arable land in this country, is that executed by Mr. John Johnston, of Fayette, Seneca county, Western New York. He has nearly or quite completed the underdraining of his entire farm. In doing this, he has constructed about fifty miles of drain, and laid down more than 210,000 tiles.

In draining, Mr. Johnston says: "The first important point is to secure a sufficient outlet. To secure this, I dug almost a canal through a part of a neighbor's farm. The main drains should be from four to six inches deeper than the drains emptying into them; not with abrupt shoulders, but levelled up so that the four or six inches rise may take place gradually in the length of two tiles, with the natural drains, to have a little curve near the end to discharge a little down stream in the main drain. The drains on my farm are from two feet six inches to three feet deep."

"My drains are from twenty-seven to forty-five feet apart, generally thirty-three feet. Nothing but thorough draining will pay, and I am convinced that money cannot be better expended in any way, than in draining the county of Seneca," a beautiful agricultural county lying between Cayuga lake on the east, and Seneca lake on the west.

"A few years since when the midge destroyed most of the wheat of six of my neighbors whose farms join mine, no one of them harvested over seven bushels per acre, while some did not get that, yet my wheat fields produced between twenty-eight and twenty-nine bushels per acre. The main cause of this difference was in the fact that my land was drained, and theirs was not. Since that my neighbors have all drained more or less, some of them having done so very extensively. True, it will not do every thing. Manure must be applied to keep up the fertility of the soil."

He recommends that every farmer of his county should make the experiment of thoroughly draining a little, if it be but an acre, and wait for the result, and "I am convinced," says Mr. Johnston, "he will require no urging to drain more."

"I began to drain under unfavorable circumstances. First, want of funds, next the tiles cost double what they do now, and last, but not least, public opinion was against me. I was taunted by the inquiry, 'Are you going to put crockery all over your farm?' Some told me that 'my farm was rather too dry if any thing; others hinted that 'they had known some men drain and otherwise improve their lands so that they lost them.' Even a Judge Cheever and a Professor Emmons, in a public discussion on agriculture, thought it might be practicable to expend from $20 to $24 an acre on draining in the humid

climate of Great Britain, but thought it questionable whether it would be prudent for Mr. Johnston to expend so much in this dry climate.

"I do not pretend to have reported their exact words, but substantially so. As soon as I saw these remarks in the papers, I answered them through the Albany Cultivator. Notwithstanding all this, I still felt confident that my draining would end well, as the excess of two years' crops after draining would pay the cost, and I persevered, and the more I drained the more I was convinced I was right, and I have not been disappointed at the results, for my fondest anticipations have been achieved."

Other and similar results in our own country and in Scotland, England, Ireland and France, might be given, but this one triumphant experiment, quoted from Mr. Johnston's report on the subject, is deemed sufficient to confirm the argument for deep and thorough draining.

If any farmers in Norfolk county, or elsewhere in the Commonwealth, who have lands that need draining according to the doctrines of this essay, let them, as Mr. Johnston said to his once doubting, taunting, jeering neighbors, try an acre, and wait for the results. Those who are willing to do so, will confirm the truthfulness of the views of such as advocate the importance and absolute necessity of prosecuting the work of deep and thorough underdraining, somewhat after the plan herein set forth and maintained. But do not rest satisfied when this first step of permanent improvement is taken, for if you do, you will be ultimately disappointed in results. In addition to draining, you must introduce deep and thorough tillage, and besides, make a liberal use of fertilizers.

The earth thus treated will be found a liberal rewarder, returning the husbandmen, some thirty, some sixty, and to others even a hundred fold. They who drain and till deeply and thoroughly, and sow liberally, shall reap bountifully, and thus have the satisfaction of seeing the work of their hands prosper.

ORCHARDS.

MIDDLESEX.

From the Report of the Committee on Fruits.

Peaches, we have learned from experience, are unprofitable except when planted on high land, where a crop may be produced on an average, as often as two years in three. This is not a paying business, or one that affords a high degree of satisfaction, to prune and cultivate peach trees from year to year, and only get an occasional crop. Our own experience in the business is this: we have three peach orchards, from two of which, though they are somewhat elevated above the hollows, we have gathered but one crop during the last three years. Our other orchard, which is on the highest spot, or nearly so, upon our farm, during the last three years has produced three crops of fruit. Quite a difference, especially in a pecuniary point of view. For a peach orchard, we prefer a gravelly, rather hard, and naturally, dryish soil; sandy soil is entirely unfit in this climate.

Peach limbs split from each other so easily, when allowed three or four leading branches of nearly equal size, that we prefer to let them have an upright leader in the centre of the tree, with side branches stretching off at angle a little above the horizontal line, for the reason that such branches grow in as strong as a pin, and are not liable to split from the main stem; give them an annual shortening in, and keep them moderately thrifty by dressing and cultivation, but avoid a forced or rampant growth of peach trees in cold Yankeedom. We have found that those varieties with glandless leaves are not so healthy, do not thrive and bear so well as those with glands. Early and late Crawford are among the most popular market varieties. Many others are good, and persons can govern themselves in selecting trees according to numbers wanted, of early, late and mediums. We have two varieties which we consider most profitable to us: Butler's Late, and Osgood's Late Yellow. The former originated in Pelham, N. H., on the farm of Asa Butler, and the latter in Dracut, by William F. Osgood; both

late, as the names indicate, very prolific, and bring a high price in market. We are sorry to be obliged to say our stock of trees of both varieties, for this year is exhausted.

For the committee,

ASA CLEMENT.

WORCESTER NORTH.

From the Report of the Committee on Orchards.

We visited and carefully examined the several orchards entered, on the first and second days of October last, commencing at Mr. John Minott's, in Westminster. His apple orchard contains one hundred and forty trees, which will appear by his statement, as will also his method of setting and cultivating his trees. The soil is a warm, sandy loam, nearly level, protected on the west and north by woods. There are many good trees in this orchard, and many have been injured; diseased spots on body and limbs may have been produced by the ox or the plough; if so, however, we think Mr. Minott was not with the team. We judge him to be a good farmer, his cultivation is clear and thorough, no weeds or grass around his trees, or wall which protects his orchard; the whole ground is cultivated in this orchard neatly. We have no doubt but Mr. Minott has the best apple orchard that can be found in his vicinity. His farm is located in the west part of Westminster; for further particulars would refer to his written statement. His pear orchard is situated near his dwelling-house, sloping gently to the south; soil a good warm, and strong loam, rich and in good cultivation as a vegetable garden; contains sixty-eight pear trees, generally looking well and making a good growth; we think they have been well cultivated and the soil and location well selected. We have no premium at our disposal for a pear orchard, but the committee were unanimous in the opinion that Mr. Minott richly merited something at our hands, for his success in cultivating the pear, and we recommend a gratuity of $4 to him for his pear orchard; we would also refer to his written statement relating to pear orchards. Justice demands that we state that the committee were most kindly and hospitably received and entertained by Mr. Minott and family; we were

pleased with his farm and the general indications of neatness and good husbandry; but on entering his house we found it was not all outside show.

We next visited Dr. C. C. Field's orchard, in Leominster. His trees have been planted nine and ten years, all the same age from the budding, are in a good bearing condition, remarkably uniform in size and appearance. There are one hundred and eighty trees, mostly Baldwins. They were carfully selected and planted by a gentleman who understands the business. The soil is a strong slaty loam, sloping gently to the south-west; the trees are all healthy and very perfect; it is a beautiful orchard. The statement of Dr. Field will give his mode of cultivation and general management of his trees, and contains some very good suggestions, which see.

Joseph Peirce's orchard is in the village of Fitchburg, on Prospect Street; contains thirty-three trees, on a pretty steep, side hill, sloping to the east or south-east. His trees are not as uniform in size and appearance as Dr. Field's; has some very good trees—the soil is a clayey loam on a clay subsoil; has been troubled with the borer considerably, and thinks his trees have been injured by potash water, used before he bought the orchard. His trees are now growing well, the land is in good cultivation, and he intends keeping it so.

Addison Hubbard's is near the village of Fitchburg, on Mechanic Street; is located on a steep side hill, with nearly the same inclination to the east and south-east as Mr. Pierce's—soil gravelly loam, resting on clay and mica slate; his orchard contains 118 trees. His statement shows the manner he obtained his trees; they are set only one and a half rods apart, which is quite too near. Mr. Hubbard has at present a very good orchard, producing well; they have been planted from twelve to fifteen years. What has been done in this orchard has mostly been done by Mr. Hubbard's own hands, and it is not a little; he deserves much credit for what he has accomplished. He obtained the second premium on his orchard in 1855; he could now only compete for the first. We found those we thought better.

We have next to notice the orchard of our president, Dr. Jabez Fisher. Here we spent several hours, with much pleasure and some profit. His statement is full and particular, and for most

particulars we would refer to that. His trees have been set four years, and were from two to four years from the budding when set; some of their heads had got turned a little in the nursery. This defect he is overcoming, and in a year or two, all other things being equal, their heads will be equal or nearly so. The trees are making a very strong growth, all look healthy and in good condition, with the small exception already mentioned, and this pertains to a small part only of his 137 trees. The committee were satisfied that this orchard will be better, and more perfect in a year or two than it is now; it will then be best.

After making a careful examination of these several orchards, the committee were in no doubt which were the best *two;* the next question, which was the best *one*, was not as readily decided; after due deliberation, however, the committee were unanimous in their opinion that the orchard of Dr. C. C. Field, of Leominster, is *now* the *most* perfect, and awarded him the first premium of $10; and the second premium of $5 to Dr. Jabez Fisher, of Fitchburg, for his orchard *now almost* perfect.

Before preparing this report, the chairman of the committee has carefully examined all the reports of former committees on orchards, and competitors' statements of their management of their respective orchards, and various incidental remarks on the same subject, which have fallen from committees on fruits, and committees on farms, and from other sources which have been published in the several volumes of the Agriculture of Massachusetts; from these much that is valuable may be gathered. Most individuals who have planted an orchard have made some mistakes, either in their mode of planting, the selection of a location, or subsequent management. These mistakes they have stated to warn others that they may avoid the same. To those about to plant an orchard, I would say, consider well the subject before you begin; you are about to erect a monument for several generations to come; if you, and those who come after you do your duty, it will stand firm for more than a century. Should a work of this magnitude be commenced without due preparation? The mere bringing together of all or many important facts which have been well established by past experience of the most scientific cultivators of fruit, would not be as satisfactory and convincing as for each individual to collect

for himself from the various sources heretofore alluded to, and others which may be within his reach, where he will find the facts and convincing proof of these facts which could not be collected and spread before you in this report. I cannot close without particular reference to the excellent report of your own committee of last year, which contains much that is worthy of careful consideration; also to the report of Mr. Ives, of Salem, and the address of Marshall P. Wilder, all of which may be found in the Agriculture of Massachusetts. Examine them carefully and you will be richly rewarded; one word more, learn to handle an apple without bruising it, which is my first commandment.

Respectfully, for the committee,

JONAS A. MARSHALL, *Chairman.*

Statement of C. C. Field.

The orchard which I offer for premium consists of one hundred and eighty trees. Most of them were transplanted in the spring of 1848, and the remainder in 1849; the latter were of the same age from the budding as the former, and they are now quite as large. Before setting the trees, the holes were dug four feet in diameter, and from fifteen to eighteen inches deep. The sods and surface soil, together with a small quantity of swamp muck in dry places, where the trees would be likely to be affected by drouth, were returned to the bottom of the holes; the finest and best part of the soil in the vicinity of the holes was carefully placed around and above the roots, using the hands when necessary; and then the subsoil was spread on the surface. The trees were set a little lower than they stood in the nursery. One row of nine trees had a horse-cartload of "horn piths" to every three trees, placed in the bottom of the holes, but they are no better now than many others. The whole ground, where about one-fourth part of the orchard was planted, has been under constant cultivation with corn, potatoes or fodder corn, and here the trees have made the best growth. About one-half of the orchard has been cultivated all the time except three years; one year wheat or rye was raised, and two years grass. The remaining one-fourth has been in grass all the time; but a large circle around the trees has been dug up here

each spring, and a dressing of compost applied every fall. On the cultivated part, no special application of manure has been made to the trees besides that spread upon the whole surface for the corn or potatoes.

The trunks of these trees have been washed with potash water, strong soap suds or ashes and water, twice a year; nevertheless, the borer has left the marks of his depredations, particularly on those where the grass or grain was allowed to grow around them for one or two years. Where the whole ground has been kept under constant cultivation, the borer has seldom found a lodgment. To insure the best growth of the trees and for the prevention of the ravages of the borer, I am satisfied that the whole surface of a young orchard should be kept cultivated and manured for some hoed crop. And even in an orchard of old trees the increased quantity and improved quality of the fruit will amply repay the farmer for keeping the whole soil under good tillage.

The trees in this orchard, when originally set out, were all Baldwins except one Williams' Red, three Danvers Sweet, two Hubbardstons, and four Roxbury Russets. To have some *variety* of fruit, and also to test the quality of some other kinds, more or less approved, I have changed the tops of about thirty of them by ingrafting one or more with each of the following varieties, viz.: Williams' Early Red, Peck's Pleasant, Gravenstein, Early Sweet Bough, Seaver Sweet, Washington Sweet, Rhode Island Greening, Early Harvest, Leland Spice, Shirley, Canada Reinette, Red Astrachan, Minister, Holmes, Holden, Ladies' Sweet, Mother, Jewett's Red, Hunt's Russet, American Golden Russet, and Northern Spy. The process of grafting I commenced four years ago, and occupied three years, changing one-third of each tree in a year, beginning at the top. The growth of the trees has been somewhat retarded by grafting, the Rhode Island Greening, Williams' Red, and Early Harvest, being the least affected in that way.

Statement of Jabez Fisher.

The apple orchard which I enter for premium is made up of 137 trees, of the following varieties, viz.: thirty-one Baldwin, twenty-one Hubbardston Nonsuch, eleven Minister, ten Danvers Winter Sweet, nine Coggswell, eight Porter, seven Large

Yellow Bough, six Williams' Favorite, six Roxbury Russet, six Fameuse, six Red Astrachan, five Seaver Sweet, four Hunt Russet, four Ledge Sweeting, and three Colchester.

With the exception of a few trees, the orchard was planted in the spring of 1854. The trees are set in the quincunx form, at a distance of thirty feet from each other. Peach trees were set among the apples, but eventually it is expected that the whole ground will be occupied and covered by the apple trees alone. The soil is a strong loam, sufficiently retentive of moisture, and capable of producing upwards of ninety bushels of corn to the acre, if weighed previous to drying.

At the time of setting the orchard the land was in sward. Preparations were made by digging holes five feet in diameter, and twenty-two inches deep. These were filled with sods and loam, and the trees carefully planted. They varied in size somewhat, having cost from twenty-five to fifty cents each, a rather large price I am aware, but I have not seen occasion since to regret the purchase of such fine specimens.

I applied different manures and special fertilizers by mixing them with the loam used in filling up around the trees at the time of planting, but I have not been able yet to discover that any one of them possessed advantages over the others, or in fact that any benefit has accrued from the use of either of them.

In 1854 the only cultivation attempted was once pulling weeds. In 1855 the whole ground was ploughed and planted, and has been kept under cultivation ever since. I have manured but moderately, and with the exception of a portion of the ground which has this season carried a fine corn crop, I have cultivated roots. I find, however, from the rapidly increasing shade, more especially from the peach trees, that I shall have to give up cropping altogether very soon, but cannot bring myself to believe that I can afford to relinquish cultivation.

The average annual growth of the whole orchard since the first season, has been about eighteen inches. The Baldwin is the finest grower, while the Roxbury Russet and Coggswell are nearly as good. Specimens of each of these will measure thirteen inches in circumference at a foot from the ground, and two or three of them fourteen and a half inches. The most

productive is a Porter, which bore the past season upwards of three pecks of good fruit.

In 1856 the trunks of the trees were washed with a mixture containing a pailful of water, a pound of potash, and a shovelful of fresh cow-dung. Since that time I have discarded the use of dissolved potash altogether, as it gives to the bark an unhealthy red and blistered look; especially on the south side. In the spring of the present year I used equal parts of soft soap and fresh cow-dung, sufficiently diluted with water to be easily applicable with a whitewash brush. With this compound I feel well satisfied, as it remains on during a considerable time, and leaves the bark of that deep, olive green color, indicative of vigorous health.

The borer has thus far done but little injury. My course is to examine each tree at least twice in a year with jackknife and wire. As soon as the first of September, all of the eggs deposited by the insect through the summer have hatched, and the larvæ may be readily found by their borings. From the superficial character of their operations at this time they are very easily destroyed, and a careful examination in spring will disclose any that may have been previously overlooked. With regard to the best time for pruning, we may find authority for performing the operation at almost every season of the year; but as to the result of my own reading and observation, my plan is this: Keeping in view these two great principles, that winter pruning promotes growth, and summer pruning or pinching, increases fruitfulness, I prune at any time when it is most convenient, being careful, in the words of an old authority, to prune only "when my tools are sharp." If I at any time expose any considerable surface of wood, I am careful to cover it with the shellac solution, which prevents decay, and the wound is soon covered with bark.

Statement of John Minott.

The apple orchard which I offer for premium consists of one hundred and forty trees, of some twenty-seven different varieties, which were transplanted in the spring of 1852–3. The holes were dug about five feet in diameter and about two feet deep, and filled with top loam. The land was pasture, ploughed

in the spring of 1851, and planted with corn, with one shovelful of compost manure to the hill. In 1852 planted with corn, and eight hills potatoes around each tree, with stable manure under the potatoes; corn manured same as last year. In 1853 and 1854, planted and manured same as in 1852; in 1855 sowed with wheat and clover; in 1856 cut a crop of clover the last of June, and ploughed in a crop of clover in September. During the last two years I have kept the grass and weeds clear from the trees. I think the clover had a good effect on the trees, but the year it was in wheat my trees made the least growth of any, after the first year of transplanting. In 1857 I planted with corn, manured with guano and phosphate of lime, and eight hills of potatoes under each tree, manured with stable manure. In 1858 planted same as last year, except the corn was manured with one shovelful of compost manure to the hill. I have washed my trees with lye made from wood ashes, hardly strong enough to bear an egg, with some soap stirred in. I think this as good a wash as I can apply to my trees. I have had considerable trouble with the apple borer; I find that my only remedy is to follow him with the knife; I examine every tree two or three times each season. I do not think washing the trees will destroy the borers after they have got under the bark. I have tried banking up my trees two winters to prevent the mice eating the bark, but I have come to the conclusion that it is a bad practice; I think I have lost seven or eight good trees in consequence of the dirt freezing and thawing, so as to kill the bark entirely round the trees some four or five inches wide, while I have lost but one tree in six years by the mice.

The pear orchard which your committee examined when at my place, consists of sixty-eight trees; sixty standard trees and eight on quince stocks, of some twenty different varieties, viz.: ten Flemish Beauty, eight Bartlett, four Buffums, four Dunmores, three Andrews, three Seckel, three Lawrence, two Napoleon, two Winter Nelis, two Bleecker, two St. Gishlin, two Louise bonne de Jersey, two St. Michael, two Glout Morceau, one Belle Lucrative, one Madeleine, two Rostiezer, and several other varieties that I do not recollect. I got forty of my trees of Messrs. Bond & Damon, of North Brookfield, and trans-

planted them in the spring of 1855; the remainder came from Rochester, New York, and were set in the spring of 1856 and 1857. I think those that came from Brookfield have made a more vigorous growth than those that came from Rochester. In my little experience in cultivating the pear, I find that some varieties make a much more vigorous growth than others; for instance, the Flemish Beauty, the Buffum, the Dunmore, the Napoleon, and some two or three other varieties have made a very good growth, while the Bartlett, the Winter Nelis, and some others have made very little growth.

I keep the ground cultivated by making it a kind of a vegetable garden, where I raise my sweet corn, early potatoes, peas, beans, ruta-bagas, squashes, &c.; I manure with stable manure spread and ploughed in. I have washed my trees with a weak lye and soft soap twice a year; I think this as good a wash as I can apply to them.

My experience with the dwarf pear is very limited, and I have little faith in them; those that I have set have made very little growth. I manured as high as I thought it would do, and cultivated in the best manner, but still there is no growth. Perhaps some of the honorable committee can give me some information in relation to cultivating the dwarf; if so, it will be gratefully received.

PLOUGHING.

WORCESTER.

From the Report of the Committee.

Ploughing, or some other mode of turning up the soil, is, in all cases, necessary to render it suitable for the reception of seed, and the nourishment and growth of plants.

In performing the operation, care should be taken that the furrows are all equally deep, and the furrow slice of the same width in all its parts, and if a little lapped upon the preceding furrow slice, it will be found on harrowing, that a much better

seed bed will be formed, and a space left under the slice for air to circulate, and cause a more rapid fermentation and decay of the soil, than when turned flat or shut in. It is also important that particular attention be paid to the state and nature of the ground to be ploughed; by so doing, the preparation of the land may be rendered more perfect, and some of its natural defects removed, or greatly modified. Some soils, if ploughed in the autumnal months, are rendered more capable of imbibing, and retaining a larger proportion of atmospherical influences and moisture, for the succeeding crop, than if turned up in the spring or summer months, when ploughing causes a greater waste of fertility by evaporation of moisture, and the volatile qualities of the soil.

Ploughing and preparing lands that are dry and light, and that possess too little tenacity, in autumn, and introducing the seed in spring, without additional preparation, except harrowing, will often preserve them in a moist, adhesive condition, and in better state for the crop than if worked in any other way. Such lands may be ploughed when considerably impregnated with moisture; they however exhale moisture rapidly, and should not be worked too frequently in hot, dry weather. Stiff, heavy soils, that are retentive of moisture, whether cloggy or loamy, should never be ploughed in the spring when wet; if turned in that season in a wet condition, the parts of which they are composed are liable to cake into hard lumps, requiring much labor to reduce them to a fine state, suitable for a seed bed. These lands may, if quite wet, be usefully ploughed in autumn; the frost of the succeeding winter will break down and pulverize the lumps, rendering them fine for the spring crop.

There are various opinions in regard to the comparative advantages of deep and shallow ploughing. Doubtless the depth should vary in some degree according to the nature of the soil and the crop to be grown. The seed furrow should have less depth than the preceding ploughings. The character of the subsoils should also be taken into account. Some land will be damaged, some benefited by ploughing deep. Probably, in Worcester county, ploughing six or seven inches deep, except for tap-rooted plants, is more generally practised than any other depth; tap-rooted plants require deeper ploughing than cereal plants. By deep ploughing, weeds, instead of being thrown

upon the surface to wilt under the influence of the sun, are turned under beyond his influence, where the seeds remain for some subsequent ploughing to bring up to a favorable position for vegetating.

More immediate advantages may also be derived from the vegetable manures, if kept near the surface; if sunk too deep they become more or less unproductive, until brought up and ploughed under the influence of heat and air to produce fermentation. Fossil manures have a tendency downwards, and sink into the soil fast enough without the aid of deep ploughing.

JOHN BROOKS, *Chairman.*

WORCESTER NORTH.

From the Report of the Committee on Single Teams.

Before announcing the premiums, it is due to the society to lay down one cardinal principle which has governed your committee in awarding them, namely: the dispensing altogether with the whipping process; upon this point your committee are a unit, and we crave your indulgence while we dwell a little more at length upon this head.

The objects of the ploughing match are not, like those of the Grecian Olympic games, the mere naked test of agility or strength.

We have heretofore acted towards dumb animals too much upon the old puritanical doctrine of "total depravity," upon "the spare the rod spoil the child" dogma, which, leaving the question of its truth or justice upon bipeds, is totally inappropriate and ill-chosen, in the opinion of your committee, upon quadrupeds. The infliction of blows upon the poor brute begets a correspondent desire to reciprocate by the free use of his extremities, or grass-croppers, the application of which, to sensitive humanity, is not at all pleasant or agreeable; moreover, if he learns, while we are venting our spite upon him, what we really want him to do, he knows enough to thwart our desire, often preferring to let us exhaust ourselves in pounding his ribs while he still stands (in military parlance) "as you are." How often, for instance, have we seen that useful

animal, the horse, after having been beaten, kicked and thrashed for whole hours without mercy, to obtain his locomotion with a load, and to no purpose, start off almost instantly by a few gentle pats of the hand, or endearing tones of the voice. What a beast should know is, that man is emphatically his master, by the thousand different teachings which are always in a man's power, that man is his peer in *every thing*, and not in the single attribute of cruelty.

We stand then upon this position, that the ploughman who governs his team without whipping or lashing, not only governs that team best, but produces more work from them and in greater perfection. The time and strength lost in applying the whip, its shrinking, exhausting effect upon his toiling cattle is worse than useless, it is damning in its influence upon them and upon him; while gentle treatment schools the animals to desire to follow, more implicitly, the wishes of their master, and they soon learn to know, and govern themselves, by the tones of his voice. Your committee, therefore, in conclusion, submit, that the more the ploughman develops God's law of kindness, the surer he is of success, the more he will ultimately perform, and in far greater perfection.

A. Crocker, *Chairman.*

From the Report of the Committee on Double Teams.

The chief design of a ploughing match is, to encourage and expose to view, the best acquired skill in holding the plough and managing the team; for it requires no small amount of practical experience and tact, to become a good ploughman, hence the art is worthy of the ambition and persevering effort of every tiller of the soil.

A few things may be specified as necessary to constitute a *good* ploughman. The first requisite is a good and properly constructed plough. If the land be smooth and level, probably there is no plough that performs better service than the Michigan Sub-soil. If, however, the surface is uneven, a well constructed side-hill plough, is undoubtedly preferable to any other. The farmer should have, if able, ploughs of different kinds, so that he may adapt the implement to the condition of the land that he proposes to cultivate.

Next in importance is a stout and thoroughly trained team. Many farmers pay but little attention to the securing and preserving of a suitable team for the general purposes of agriculture. Doubtless, throughout most of New England, oxen are preferable, for most of the purposes of farming, to horses or mules. Especially is this true in reference to ploughing; their gait is less rapid, and the plough is drawn with more evenness and force, and hence the furrow may be turned with greater ease and uniformity. It is highly important that the cattle should be well matched in size, weight, motion, and temperament; with these requisites, and proper training, united with kind treatment, your cattle may be educated to perform their tasks with ease, skill, and profit. It is also necessary that the driver should control *himself* if he would succeed in controlling his oxen. I have always noticed that all well-bred oxen show a proper resentment to the use of loud, boisterous and profane language, when addressed to them, and are quite as likely to go wrong as right, under such circumstances; hence, let passion be restrained, and kind words used, and the effect will be salutary on both man and beast.

Many farmers in selecting their ploughs, aim to get those that turn the widest furrow, in order to complete their work with greater despatch. Some of these ploughs turn a furrow from fourteen to eighteen inches in width. Now experience and observation in England and Scotland, have proved that a furrow more than twelve inches in width is not so favorable for perfect and thorough pulverization as those within that width; hence the furrow slice should be no wider than what is necessary for the complete turning of the sod.

Much has been well and properly said of late years, in regard to ploughing deep. There can be but little doubt in the mind of any candid and reflecting man, that the neglect of deep ploughing has been the great mistake of all past generations of farmers in this country. When we remember that many of our grain and vegetable roots penetrate to the depth of from one to three feet, what folly is it to skim over the surface to the depth of five or six inches, as was formerly the universal practice. It is well that our farmers are beginning to awake to this important matter, and as the result, we may expect surer and larger crops. We would say never plough less than eight inches deep,

and all that you can increase beyond that depth will materially aid in the growth and maturity of your crop.

J. S. Brown, *Chairman.*

MANURES.

ESSEX.

Report of the Committee.

There is no subject of greater practical importance to the agriculturists of New England than that of manures. Indeed it is impossible to cultivate our soil successfully without understanding their importance, and learning the more economical modes of preparing and applying them for the use of vegetation. This is a subject of vast extent, requiring, for a full discussion, great minuteness of detail, and for precise accuracy the frequent use of chemical terms which cannot be fully understood by the farmer unfamiliar with scientific knowledge, and I only propose, in the brief space proper for this report, to submit some general views upon the subject, avoiding the use of chemical terms, aware that by such a course I shall be open to the charge of want of exactness and precision.

In order properly to understand the value and effects of manures it is necessary to know how plants receive their food—what there is in the original soil which affords nutriment, and what part each constituent of the same performs in the great phenomena of vegetable life.

The plant receives its entire nutriment through the pores in its leaves and in the fibres of its roots, which are so minute as not to be discernible by the naked eye. Consequently, every thing that feeds it must be in either a liquid or aeriform state. In no other condition can nutriment enter into the composition of a plant. Through the leaves, it is supplied by the air aided by the light and heat, with gases necessary for its support, and from snows, rains, dews and evaporation, it is supplied with moisture and nutritive substances in minute solution. So much is received through this medium that some kinds of plants are supplied almost entirely through their leaves. But important

as are the leaves in sustaining the plant, it is of little importance in this connection, to inquire into the mode in which they receive and impart nutriment, as the amount cannot be affected by artificial means. The other medium through which the plant receives its support, is the root fibres; and this is of by far the greatest practical importance, as this support may be increased almost indefinitely by supplying to the soil substances necessary for vegetation, in which it is deficient.

Soils are composed of clay, sand, lime, mineral substances, and the mould of decayed or decaying vegetation. The clay and sand, excepting in locations where lime abounds, compose by far the largest portion in weight; the mineral substances are in minute quantities, and the mould, although diffused throughout the whole soil and apparently a considerable portion of it, consists of only from 3.100 to 5.100 in weight of the whole, in average soils. All these substances perform an important part in the support and nourishment of the plant, and for its successful growth all are requisite in proper combinations. Yet the mould and mineral substances comprising together not more than 5.100 to 6.100 of the soil, are substantially all that afford direct nourishment to the plant. The clay and sand, although by chemical action forming an ingredient of some plants, are principally and almost entirely useful for the purpose of giving mechanical support to the plant, and retaining and imparting nutriment for its use. They constitute the foundation to hold the plant, and the repository of its food, and as such they are of the greatest consequence. The fertility and permanent excellence of a soil depend very much upon the proportions and combinations in which these earths are found. Every farmer understands the difference between clay or heavy soils, and sandy or light soils; and that the best soils are those which are composed of both in such proportions as not to be too stiff and hard with an excess of clay on the one hand, or too dry and porous with an excess of sand on the other hand. In proper combinations the clay in the soil acts to retain the moisture and the nutriment, and prevent too great an extension of the roots; and the sand acts to loosen, render more friable the soil, and to admit into it the heat and the air in proper quantities.

If the clay is in excess, its injurious effects are :—

1. It retains more moisture than is needful for the plant.

2. It attracts and holds the nutriment, and does not impart it sufficiently for the proper nourishment of vegetation.

3. It renders the soil hard, and difficult to cultivate.

4. It resists the proper extension of the roots.

5. It prevents the proper effects of the air and the heat.

6. In dry weather, it cracks and admits the air directly upon the roots, which is always injurious.

If the sand is in excess, its injurious effects are :—

1. It has but little adhesion to the nutritive matter, which is quickly washed out, or is supplied too freely to the plant, consequently the soil is quickly exhausted.

2. It does not sufficiently retain the moisture for the plants.

3. It does not attract fertilizing particles from the atmosphere.

4. Being a good conductor of caloric, it transmits to the roots immediately the influences of sudden changes in the temperature of the atmosphere.

These facts show the great importance of ameliorating clay land with sand, and sandy land with clay. In many parts of England this has been done with most successful results, and there is no reason why our farmers may not by this method greatly benefit their poorer lands, as in most instances beds of clay may be found in the vicinity of sandy lands, and sand in the vicinity of clay lands. Probably nothing that can be done to such lands will be more permanently beneficial.

Besides the clay and sand, the composites of soil are mineral substances and vegetable mould, in the quantities before stated. These afford the nutriment to the plant. The term vegetable mould or humus, has been used by some writers with a more extensive signification than that in which I propose to employ it in this report.

It has been used to define the entire organic and inorganic, or mineral substances of a plant, in a certain state of decomposition and solution. It is a dark, and when moist, an unctuous mould, produced not only by the corruption and decay of the falling leaves, the plants themselves, and the roots remaining in the ground, but also by the putrefaction and decomposition of animal matter, although the latter contains the ingredients of the former in different proportions and is especially rich in

ammonia. By mould, as I shall use the term, I include only the organic matter distinct from the mineral substances in cohesion with it, and this includes by far the largest portion in amount and weight of the decomposed matter. This mould of itself, is of great benefit in improving the texture of the soil, in rendering heavy land looser and warmer, and light soil more tenacious. And if it had no other effect it would be of very great value to the land. But when turned by the spade or plough, and exposed to the air, moisture and heat, and acted upon by the mineral substances in combination with it, it becomes gradually still further decomposed, and furnishes continual nourishment both in a liquid and gaseous form to the roots of the plant. It also acts upon the mineral substances in the soil, rendering them soluble, so that they can be received by the plant. The amount of this mould, necessary for the support of vegetation in soils of proper compositions, is comparatively very small, as such lands may be cropped for a series of years without their becoming exhausted. The comparative value of the mould as food for the plant, has been much considered by scientific men of the present century, and without entering into the discussion it may be sufficient for my purpose to state that all regard it as of very great importance to vegetation. From its intrinsic value as containing many of the elements of the plant, and its slow decomposition, and as a means of improving the texture of the soil it is second in importance to no other material in the soil. In addition to its effects when decomposed to the extent above stated, there is no doubt that in the process of such decomposition it eliminates much that affords nutriment to the plant, particularly of ammonia to which I shall hereafter refer.

The mineral substances in the soil are also necessary, both in affording aliment to vegetation, when dissolved, and as stimulants to the soil. They are both indispensable for the proper growth of the plant.

But in considering the practical value of these nutriments to vegetation, we must always take into consideration the situation of the soil with which they are incorporated, and the exposure to air, heat and moisture to which they are subjected. Land rich in fertilizing matter, yet excessively moist, is unproductive, and grows nothing but sedge and other coarser grasses. The

land becomes sour, and will be nearly valueless, unless drained and exposed to the proper action of air and heat; and if exposed to excessive heat or dryness, the fertilizing substances will not properly act upon each other, as a certain amount of moisture is always necessary for the preparation of the food for the plant. The frequent stirring of the soil, in good situations, is also necessary to quicken the action of the fertilizers it contains. This is so important in its effects, that some of the early writers regarded it as the sole means of increasing the fertility of the soil.

Keeping these general statements in mind, we can more readily appreciate the importance of increasing the fertility of, or replenishing the soil with nutritive matter. And in considering this subject I shall first refer to those manures which are more commonly used, and better known to our agriculturists, having a view to the permanent improvement of the land rather than to the greatest immediate effect of fertilizers.

In other countries, and in some portions of our own, devoted principally to gardening, the crop cultivated annually is looked to for a remuneration. But with us, the land is cultivated principally with a view to improve it for the subsequent crops of grass, and our farmers look more to the length of time it can be kept in grass without cultivation, than to the crop which is the immediate result of it.

All the ordinary or barnyard manures, contain matter which is convertible into mould, and mineral substances. Those which have a larger portion of the latter are more forcing or stimulant in their operation, and some in their putrefaction and decay afford more nitrogen in the combination known as ammonia, than others. This is very important to the growth of a plant. It is particularly stimulating to vegetation. Comparatively speaking, the solid excrements of all herbiverous animals are rich in mould-forming substances. The urine is richer in mineral substances and nitrogen, and consequently, more stimulating. Together, they furnish the most complete manure for plants, as they combine *all* the substances both organic and inorganic, which are necessary for the perfection of a plant and its seed. The excrements of domestic animals are relatively lasting in their effects in the order below stated, cow manure

being most lasting and least stimulating, and sheep manure being most stimulating and soonest expended.

1st, excrements of horned cattle.
2d, " of swine.
3d, " of horses.
4th, " of sheep.

The value of the excrements of the above named animals, particularly swine, is affected very much by the quality of their food.

The following figures, taken from the latest edition of Stöckhardt's Chemical Field Lectures, show the constituents of these different excrements. The figures are based upon the weight of the excrements and not upon the *amount*, as we usually consider them. This is important to be remembered in this and subsequent tables, as there is a great difference between the weight of a cord of cow manure and a cord of horse manure. The figures of course are only approximate, although based upon actual experiments.

One thousand pounds of fresh excrements contain:—

CONSTITUENTS.	Of Cows fed during winter.	Of Horses fed during winter.	Of Sheep fed upon hay.	Of Hogs fed on strong fodder.
Solid dry substances in general, . . .	160	240	420	200
Nitrogen therein, . .	3	5	$7\frac{1}{2}$	6
Mineral substances therein,	24	30	60	30
Consisting of—				
Potash and Soda, . .	1	3	3	5
Lime and Magnesia, .	4	3	15	3
Phosphoric Acid, . .	$2\frac{1}{4}$	$3\frac{1}{2}$	6	$4\frac{1}{2}$
Sulphuric Acid, . .	$\frac{1}{2}$	$\frac{1}{2}$	$1\frac{1}{2}$	$\frac{1}{2}$
Common Salt, . .	$\frac{1}{20}$	–	$\frac{1}{4}$	$\frac{1}{2}$
Silica, ...	16	20	32	16
Approximate value in money, ...	54	90	135	96

The following figures from the same author show the constituents of the urine of different animals and their comparative value.

One thousand pounds of fresh urine contain :—

CONSTITUENTS.	Of Cows.	Of Horses.	Of Sheep.	Of Hogs.
Solid dry substances (extract,)	80	110	135	25
Nitrogen therein, . .	8	12	14	3
Mineral substances therein,	20	30	36	10
Consisting of—				
Potash and Soda, . .	14	15	20	2
Lime and Magnesia, .	1½	8	6	½
Phosphoric Acid, . .	-	-	½	1¼
Sulphuric Acid, . .	1½	1½	4½	-
Common Salt, . .	1	2	2½	5
Silica, ...	$\frac{1}{10}$	¼	-	-
Approximate value in money, ...	120	170	200	45

The following calculation by Stöckhardt, shows approximately the value of the excrements which these animals furnish in a year :—

	Pounds.	Value.		
One cow furnishes yearly—				
In excrements, . . .	20,000	£4	10	0
In urine, ...	8,000	4	1	0
Total, . . .	28,000	8	11	0
One horse furnishes yearly—				
In excrements, . . .	12,000	4	10	0
In urine, ...	3,000	2	5	0
Total, . . .	15,000	6	15	0

One sheep furnishes yearly—	Pounds.	Value.		
In excrements, ...	760	£0	9	0
In urine, ...	380	0	6	9
Total, . . .	1,140	0	15	9

One hog furnishes yearly—				
In excrements, ...	1,800	0	16	10½
In urine, ...	1,200	0	4	6
Total, . . .	3,000	1	1	4½

From these calculations it will be seen that the urine is of great value and that it is important for every farmer to use freely litter, muck or other substances for its absorption.

Very important questions arise as to the time when barnyard manure should be put into the ground, and the manner in which it should be kept until so used.

Practical agriculturists, by various experiments upon a large scale, have demonstrated that barnyard manure turned under the soil in a fresh and unfermented state is of greater value than when left to rot and ferment in the dung-heap, even when that is properly protected; and the practical results in this accord with sound theory, as in the process of fermentation and decay, gases escape which are of value to vegetation. If not immediately turned under the soil, manure should be kept where it will properly ferment, without being exposed to heavy rains, and if so kept, the amount of gases which escape is not great, and the mineral substances are not affected, and manure rotted in such a position, although much reduced in quantity, is more immediate in its effects, and nearly as valuable in its properties, as when carted upon the land in a fresh state. Experiments show that the amount of actual loss in manure thus cared for is very slight. But if the manure is exposed to heavy rains its depreciation is very great, as a large portion of its mineral substances is washed from the heap and lost. In accordance with these views I would suggest whether there is any appreciable loss from spreading barnyard manure upon the surface of the ground intended to be enriched, and allowing it to remain for a length of time without being covered with the soil. Being thinly spread there will be but little fermentation,

and the mineral substances which will be separated from it by the rains will be washed into the land where they are needed. And this may aid in settling the question of the economy of top-dressing grass land with barnyard manure. I think that by so doing but little of the value of the manure is lost, particularly if properly rotten when applied, and the land receives substantially its full effects without the expense of turning the soil. If thus applied it is better that it should be done early in the spring so that it will get partially incorporated with the soil and protected by the growing vegetation, before it is subjected to the scorching droughts of the summer.

One of our most intelligent and successful farmers, Samuel A. Merrill, of Salem, informs me that for the three past seasons he has, early in April, spread upon two or three acres of grass land, fresh barnyard manure, free from litter, at the rate of about four cords to the acre, and that the results have been most satisfactory.

In addition to these manures, human excrements, both solid and liquid, are rich and stimulating in their character, so much so that they should only be used composted with other manures needing stimulants, or with common soil. Used in this manner they are of great value to the farmer.

Animal matter is also a very important manure from the mould-forming substances it contains, from its mineral ingredients, and the amount of ammonia it creates in the process of putrefaction. It is one of the most active stimulants, and should always be used in compost, otherwise the ammonia will quickly escape, and its effects will be of little value. The harder portions of the animal such as the horns, hoofs, hair, &c., are not so readily decomposed.

Straw, hay, leaves and decayed vegetation are of great importance in improving the soil, as they decompose but slowly, and furnish a large proportion of mould. They are of most importance in combination with other quicker manures, as they absorb the liquids and the gases, and their decomposition is accelerated by the stimulants with which they come in contact.

The above described are the ordinary manures used by our farmers; yet there is another source of fertility, which, although resorted to by some, is not sufficiently appreciated by any. I refer to the rich deposits of our intervales, which we call muck.

This term has in other places a more general signification, but with us it is limited to define this deposit.

There is no portion of the country which contains so large an amount of this fertilizer as this section. There is hardly a farm in Essex county which is not rich in this material, and yet until within the last few years it has been but little used. Muck varies essentially in its constituents and in its value. The best is the deep, dark colored deposit, free from large roots, found in low lands, which, when dug up and exposed to the air and the action of the frost, becomes crumbled and fine, having very much the appearance of ashes. A large percentage of this is vegetable mould, which has remained substantially in the same state for centuries. It also contains a considerable amount of mineral substances, but from the great quantity of moisture to which it has been continually subjected, the mould has not decomposed. From the same cause, tannin and acetic acid have been formed in it, which renders the muck sour and unfit in its original state for the support of vegetation. But when exposed to the air and frost, and its sourness corrected by mixture with stimulating substances, it becomes one of the most valuable fertilizers.

Peat muck is also an excellent fertilizer, but, from the slow decomposition of the roots which compose it, it is of less value than that before described.

Pond muck is the deposit in the bottom of ponds, composed mostly of substances washed from the adjacent lands, and contains less vegetable mould than either of the other kinds.

Muck may be composted with *any other* manure. All kinds of barnyard manure, particularly horse manure, corrects its sourness, adds to it the necessary salts, and renders it suitable to be applied to the soil. It is particularly valuable in the barnyard, as it is a powerful absorbent of the liquids, which more than any other portion of the manure, operate beneficially upon the muck. Wood-ashes, leached or unleached, dead animals, horns, hoofs, hide-cuttings, &c., are also of great value to compost with it. Lime is also valuable in compost with muck and either of the above manures, as it is a good neutralizer of acids, but is not sufficient alone with muck. From the large quantity of mould which muck contains, its effects are very lasting; indeed more so than those of most any other fertilizer, both in

affording nourishment to plants, and in improving the texture of the soil.

Any farmer who has a good bed of muck on his farm, can make annually, at little expense, at least as much and as valuable manure from this source, as from all the stock he keeps, and I know of some farms in this county which have been brought to a high state of cultivation, on which more than one-half of the manure that has been applied, has consisted of this fertilizer properly composted. I have seen the finest crop of corn grown on light land the first year of its ploughing, with no other manure than muck exposed one winter, mixed with a small quantity of leached ashes.

Sea manures, comprising rock-weed, kelp and muscle bed, are valuable as manures, from the fertilizing substances they contain and from the salt they furnish. The muscle bed contains much animal matter which is valuable, particularly in compost. These manures are much used upon the farms bordering upon the sea-coast, and their great value can be seen in the fertility of the lands on which they have been used.

Salt is also important to use in moderate quantities, upon most lands and in compost. It furnishes some food to vegetation, and is a neutralizer of acids. Its effects when applied on some lands in the county, have been very marked. But great care should be used that it be not applied in too great quantities.

Wood ashes, leached or unleached, are also of great value as a manure. Ashes comprise all the incombustible ingredients of plants, and are not only lasting in their effects, but from the mineral substances of which they are composed, are strongly forcing. It is doubtful whether there is any more economical fertilizer that can be used than ashes, at the prices for which they are usually sold to the soap boilers. There is not that difference in the value of unleached and leached ashes which many suppose. By leaching a considerable portion of the potash is extracted, but this is compensated for in part, by the lime and other substances mixed with the ashes in the leaching, and the leached ashes combine more readily with the salts in the atmosphere. But it should be remembered that ashes do not comprise all that is necessary for the growth of a plant, and that from their stimulating properties they serve to accelerate the decomposition of the mould with which they come in contact,

and if used upon the same land for successive years without other manures, will tend to render the soil unproductive.

Coal ashes are not valueless as is supposed by many. They contain some mineral substances, and will more than repay the expense of putting them upon the land.

Lime, of which there is comparatively a small amount in most of our soils, affords a direct nutriment to vegetation. Applied in large quantities it improves the texture of all lands except those which are excessively sandy. It acts upon the fertilizing matter in the soil both upon the mould and the mineral substances, decomposing and rendering them soluble for the use of the plants. It is injurious in combination with animal manures or common dung, as it has a tendency to produce insoluble compounds. It should never be composted with either except when necessary to prevent the noxious exhalations from animal putrefactions. It is a most powerful neutralizer of injurious acids, and is consequently most beneficial in combination with muck, or when spread upon sour lands. Upon lands containing a sufficient amount of lime, which is indicated by a luxuriant growth of clover, peas or beans, an additional application will be useless or positively injurious; whilst upon lands in which it is deficient, which is indicated by the coarse grasses they produce, the application of lime is most beneficial.

Bone manure has been used with most successful results within the last few years, and its effects upon the land are lasting. But great care should be exercised in purchasing it, as much that is offered in the market as ground bone, is a spurious and almost worthless article.

In addition to the fertilizers to which I have referred, there is another which has been used somewhat extensively for the last few years. I mean guano. It consists of the excrements of sea birds which have lived upon fish. The most valuable is that which is brought from the rainless regions of Peru. Its almost entire value consists of the nitrogen or ammonia it contains. The amount of mould-forming substances and mineral particles of this manure is so small as to be hardly of any appreciable value. The chief office of ammonia is to accelerate the development of vegetation, and it furnishes but little of the constituent elements of plants. Therefore guano is strictly a concentrated, forcing and stimulating manure. Its action is

immediate and its operation quickly over. It is mostly expended the first season. But it has not acted alone. It has stimulated the plants to search for and take up the fertilizing substances in the soil, so that each year of its application the land has become poorer. Its effect, when applied alone, except for the present crop, is positively pernicious, and the result of its continued use, alone, must be the exhaustion of the soil.

Artificial manures, also, have been recently used to a considerable extent; but if any one expects to see good results from the use of the best of them alone, he will be grievously disappointed. None of them contain all the food which is necessary for the growth of vegetation, and it requires a scientific knowledge which few farmers possess, to understand where and how to apply them to any considerable advantage. This may be said of the best of artificial manures. But there are many that are largely advertised and recommended, which are not much, if any better than common wood scrapings; and even if a farmer thinks he has sufficient scientific knowledge to properly use artificial manures, he must add to his fund of information a knowledge of chemical analysis, or purchase his special manures of dealers upon whose knowledge and integrity he can implicitly rely.

William D. Northend, *Chairman.*

HAMPSHIRE, FRANKLIN AND HAMPDEN.

Statement of Horace I. Hodges.

In April, 1857, I selected seven half acre lots, on the Hampshire, Franklin and Hampden Agricultural Society's grounds, at Northampton, and staked them off on the north-easterly side of said grounds; each lot was of precisely the same quality of soil, and in the same condition,—all down to grass,—Timothy, red and white clover. That year, six lots I gave a top-dressing, each with a different fertilizer, leaving one lot without any. Each lot has been mowed at the same time, and managed alike, and the hay upon each weighed separately, for 1857 and 1858, and the tables at the close of this communication present a full and accurate statement of the experiments upon these lots.

These experiments have been made with reference to knowing the true and exact effect of the several fertilizers on this ground by top-dressing, as it is not desirable to plough or cultivate, except in grass; (the lot containing fifteen acres being kept for the use of the society, and for the purpose of holding the annual shows,) and the result shows quite plainly that several of the fertilizers cannot be used upon these lands, as a top-dressing, to any profit. The soil is clay loam, rather cold, retaining moisture unusually late in the spring. The tables show that ashes is the only profitable fertilizer to be used as a top-dressing here. For the two years the increase of hay is much the greatest, and the only lot on which the increase of hay paid for the fertilizer the first year, and the increase of hay did not pay for fertilizer on any other lot for the two years. The lot where guano was used, gave greatest increase of hay for first year, but ashes did for second.

It is not to be supposed that the same result would follow from all soils. These experiments show the effect upon this soil and location, and may be useful in making comparisons and forming a judgment for each one's own lands.

Statement for 1857.

Numbers.	Kind of Fertilizer.	Quantity of Fertilizer.	Cost of Fertilizer.	Quantity of 1st Crop of Hay.	Quantity of 2d Crop of Hay.	Value of 1st Crop of Hay at 30c per cwt.	Value of 2d Crop of Hay at 30c per cwt.	Total value of Hay.	Increase of Hay from Fertilizer 1st Year.	Loss or Gain 1st Year from Fertilizer.
				lbs.	lbs.				lbs.	
1,	None.	None.	None.	1,335	400	$4 00	$1 40	$5 40	None.	None.
2,	Poudrette, .	2 bbls.	$4 00	1,418	400	4 25	1 40	5 65	83	$3 75*
3,	Plaster, . .	500 lbs.	3 00	1,427	400	4 28	1 40	5 68	92	2 72*
4,	Super-phosp'te of Lime, .	150 lbs.	4 00	1,535	400	4 60	1 40	6 00	200	3 60*
5,	Horse and Cow Manure, .	4 loads,	8 00	1,855	400	5 56	1 40	6 96	520	6 44*
6,	Ashes, . .	10 bu.	2 00	2,030	1,000	6 09	3 50	9 59	1,295	2 19†
7,	Guano, . .	158 lbs.	5 24	2,135	1,000	6 40	3 50	9 90	1,400	74*

* Loss. † Gain.

Statement for 1858.

Nos.	Kind of Fertilizer in 1857.	Quantity of Hay 2d Year.	Increase of Hay from Fertilizer 2d Year.	Profit from Fertilizer 2d Year, Hay at 30 cts.	Loss or gain for the two Years.
		Pounds.	Pounds.		
1,	None.	1,200	None.	None.	None.
2,	Poudrette, .	1,280	80	$0 24	Loss, $3 51
3,	Plaster, .	1,473	273	82	Loss, 1 90
4,	Super-phos. of Lime,	1,535	335	1 00	Loss, 2 60
5,	Horse and Cow Manure,	1,365	165	50	Loss, 5 95
6,	Ashes, .	1,665	465	1 40	Gain, 3 39
7,	Guano, .	1,230	30	09	Loss, 65

PLYMOUTH.

Statement of Charles G. Davis.

Having entered for premium for the greatest quantity of compost manure, and also for the greatest quantity judiciously composted from meadow mud and any alkaline substances, I will proceed to give you an account of my labors.

The mildness of the last winter afforded great facilities for digging peat, which I have upon my farm, and also on land about a mile from my house. Since the summer of 1857, I have thrown out about two hundred cords of fresh peat, and have composted most of it upon the spot, by pouring in gas water, or the ammoniacal liquor from the gas works, which I obtain in barrels, as it is drawn off from the works, and which otherwise runs to waste. I have also added gas lime, or lime which has been used for the purification of gas.

I was induced to make this experiment by the assurances received from Dr. Charles T. Jackson, in a letter in answer to my inquiries, a copy of which I am happy to subjoin. Since which, I have noticed an article in favor of the lime in the Patent Office Agricultural Report for 1856, p. 222, and in Browne's American Muck Book, p. 102. For the claims of gas house liquor as a fertilizer, I beg leave also to refer you to

the American Muck Book, p. 336. I have also seen a private letter from Professor Mapes, recommending it highly for composts with peat.

The liquor is too powerful to apply alone to land as a top-dressing, but should be diluted with three or four times its bulk of water. When applied to peat, it should be well mixed. It eats up the raw peat very rapidly, and I have found my heaps sufficiently fine by digging them over once about six months after applying it undiluted to the sour, green peat. An application of a few cords of it upon Timothy, on dry land, after mowing, had a most astonishing effect in forcing a second crop, after a shower. This was doubtless owing to the quantity of ammonia in it. It has been suggested that, like guano, its effects from this cause alone may be short-lived. But the beneficial effects of the peat,, even as a mulcher alone, upon our dry meadows, I think are much undervalued.

During the past season I have made, in this manner, from fresh peat and muck alone, about sixty cords of compost measured after it was made. One of the most remarkable, as well as discouraging, features of peat composts to the laborer is the great loss in bulk during its manufacture. Dr. Dana, in his valuable "Muck Manual," states that "peat, dried at 240° F., loses 73 to 97 per cent. of water. When allowed to drain and dry as it will, it still contains about two-thirds of its weight of water. *It shrinks from two-thirds to three-quarters of its bulk.* A cord wet becomes one-quarter to one-third of a cord when dry. To compare its value with cow manure, equal bulks must be taken; and hence to dry peat a bulk of water must be supposed to be added in proportion above stated; or, still better, because easily done, the pile of dry peat is to be estimated by the pit left after digging." He goes on to state, that the fresh peat thus measured differs little from the same bulk of fresh cow dung, so far as salts, water and geine are concerned, differing only from the cow dung in the lacking element of ammonia. This element, I suppose, is supplied to a great extent, by the gas house water; and then, if Dr. Dana's statement be true, a cord of the peat compost would be worth three or four cords of fresh cow manure, and more than four cords of the cow manure as it is found mixed with the bedding in the heap. But I claim no wisdom in these matters.

During the last season I have also made a great quantity of compost in my barn cellar. The cellar is entered by two drains, conveying offal, as well as all the sink water, from two families. To absorb this, I use a great quantity of peat, with chips, fine coal ashes and sods. My stock consisted of four cows and three horses during the winter, and an additional cow and a calf during the summer, always housed at night, with five hogs throughout the year to tend the manure. I have carted in some loam, but mostly half decomposed salt and fresh peat, sea and rock-weed. These are frequently spread with the manure, and dug over on rainy days. Six or eight horse-cart loads of the gas lime, and three-quarters of a ton of plaster, used in part in the stalls, were scattered from time to time. In this manner before June, I carted out five hundred and nine loads, of about thirty cubic feet, and have now, in addition, two compost heaps taken from the cellar since June, containing about fifty cords, making in all, one hundred and sixty cords of barn compost.

Having occasion to ditch some salt meadow, I have also collected a large quantity of salt peat and sod, some of which was used, when thoroughly dry and as light as a sponge, as bedding for horses, first chopping it into small sponges.

I have now in heaps from seventy-five to eighty cords of this salt peat, some of which was cut two years since, and the balance last fall. It decays slowly. I have not tried a solution of salt dissolved in water and mixed with quick lime, as recommended by some, for the speedy manufacture of compost from vegetable matters, because the salt peat is so open, and the sods so large and free, that I feared they would not hold the mixture to advantage unless used in great quantities. Some of these heaps are mixed with the gas lime and coal ashes, but they decompose slowly. A portion containing about ten cords of salt meadow deposit and old sods, is decomposed.

Mr. Howard has recently stated that he was satisfied that salt peat did not make a good manure, but he has given no particulars nor statistics. It is to be hoped that some one will give us more reliable information upon the subject; namely, the value of salt peat, and the best and speediest method of composting it. Such information would be of great benefit to farmers upon the seaboard. We find allusion to it in agricultural works, but

there does not appear to be any definite knowledge concerning it, either in the books or the experience of our agricultural friends. Mr. Colman, in one of his letters from England, speaks of it as better than fresh peat when rotted, but gives us no authority, any further than his own honored name.

The following is the letter from Dr. Charles T. Jackson, alluded to above:—

Charles G. Davis, Esq.:—Dear Sir,—In reply to your note of 29th instant, I would say that I have no doubt you will find the gas lime will work well with peat, which will take up both ammonia and lime, and make a good compost. I do not like the coal tar so well, and it will be best to get clear of as much of that as you can.

I cannot know what proportions the gas lime is to be used, as I do not know the strength of it and of the ammonia liquor, but you may safely add a barrel of it to a wagon load of peat.

A good liming generally stops the growth of sorrel, but should be followed with a thick sowing of clover and redtop, to get "nine points of the law" in the field, *i. e.*, possession, so as to *keep* out the sour old enemy. As to the chemical salt in gas lime, it is hyposulphite mixed with sulphate and hydrate of lime. There is also sulphate of ammonia, carbonate of ammonia, &c., &c.

Yours truly, Charles T. Jackson.

INDIAN CORN.

PLYMOUTH.

Essay by Morrill Allen.

Indian corn is indigenous to this country. It had been raised to some extent by the natives, before the discovery of the country by Europeans. Our ancestors, entirely ignorant of the plant, and its habits of growth, took their first lessons in its culture from the savages; those lessons were necessarily

imperfect, and in many respects faulty. The philosophy of a civilized race would have much sooner discovered the fallacy of them, and introduced an improved culture, had not the plant been remarkable for vigor in growth, and in virgin soil attaining maturity with very little cultivation. The method recommended by the natives was to make an incision in the soil, drop several kernels, and cover with the excavated soil. After the appearance of the plants, they scraped from time to time the surface soil around them, till little hillocks were formed of considerable height. Some imitation of this method has continued to the present time; we occasionally see what are very appropriately termed Indian hills, and which should have no place in more than a few cultivated fields. Making hills places many of the roots of corn too deep to receive those kindly influences of sun, and air, necessary to perfection in growth. Modern practice has clearly proved that if the soil be frequently and sufficiently stirred the roots of corn will find their proper place in it, and the plants will be far better supported against the influences of strong winds than when hills are formed.

The importance of the corn crop, to the prosperity of farmers, the certainty with which they may calculate on success in a judicious cultivation of the plant, combine to urge them diligently to study the habits of the plant, and to adopt the method of cultivation the most likely to give them distinguished success.

The first requisite to success is the judicious selection of soil. In New England we have a large portion of soil, in which the corn plant will prosper only in particular and peculiar seasons; tenacious and clayey soils will not yield good crops, excepting in very warm seasons, and when moderate rains are so frequent as to keep the surface soft and the pores open. Silicious soils, such as the farmers call warm, are the most certain to produce fair and well ripened crops of corn.

The various loams will do well for this crop if well saturated with manure. This article is not furnished with sufficient liberality to our corn fields generally. The corn plant is a gross feeder, and requires an abundance of food in the last stages of its growth. Hence the utility of applying a large quantity of long manure to the field in the spring before planting; this dissolves in the soil, and comes into the most

vigorous operation, at the period when the plant requires the most nourishment. The preparation of the soil for a corn crop should be regulated in reference to preceding crops; where the small grains have been raised, stubble land should be ploughed several times before planting; previous to the last ploughing, a good dressing of barn manure, not less than eight cords to the acre, should be evenly spread, and turned under with a shoal furrow; if fine compost manure is used, then the cultivator, or harrow, will place it deep enough in the soil. No manure need ever be placed directly under the corn, excepting when farmers are induced to plant fields where the soil is not well adapted to the growth of corn. In very warm, and rather dry seasons, corn will grow well, and yield abundantly, on cold peaty, or clayey soils, if a shovelful of good compost manure be placed in each hill.

But the seasons are so variable it is not prudent often to try experiments of this kind. When fields are to be planted with corn which have been in sward for a succession of years, and liberally top-dressed with good manure, it is well to plough in the fall, six or seven inches deep, according the character of the subsoil; in the spring cross-plough once or twice, without disturbing the sod; pulverize thoroughly with cultivator, and harrow, and then plant without the application of any manure. Sometimes, with this preparation, we can obtain better crops than we can when the manure is applied in the year of planting. In a soil made rich in previous years, the corn will take a natural and regular growth; in the fermentation of recently applied manure it will be forced forward too fast, in the early part of the season, and not find sufficient food at the critical period when the ears are formed. To raise corn successfully our land must be made rich, either at the time of planting, or in previous years. The time has passed, in this region, when the strength of our soils can reasonably be depended on to produce remunerating crops of corn. We must avail ourselves of art, and, with the judicious employment of this, we can produce far more corn on the acre, than is ever raised in any of the virgin soils of the Western States.

The last operation, in the preparation of a field for planting, is furrowing. This is rather a difficult part of the business, if we are anxious that the eye should be gratified in viewing

regularity. But if we have reference chiefly to the growth of the corn, it will only be necessary to attend to width and the depth of the furrow, and the rows will be nearly enough on a straight line. The furrows should be three feet apart both ways, when the corn is to be planted in hills; and when planted in drills three feet will be space enough for convenient cultivation.

Many farmers have supposed, and acted on the supposition, that if a field has a scanty dressing of manure, and is in somewhat of an exhausted state, by planting in wide rows we obtain more corn and leave the land in better condition. The experience of the writer has led him to the conclusion that both these suppositions are errors. When corn is planted four, five, or six feet apart, the hot summer suns have an exhausting influence on the soil. The middle of the rows differ very little from fallow ground, which, it is generally believed, injures the soil. In poor land, no doubt, a less number of plants should be cultivated than in rich land; let it be done by leaving a less number of plants in the hill, or placing the kernels farther apart in the drills. Where no space is left in a field, destitute of a plant, more than three feet wide, the soil of the whole field will be likely to be evenly tilled, which is of considerable importance, and, as the plants grow, they will form a screen for the ground from the direct and scorching influences of the sun. In general practice, probably it is best to plant three feet apart each way, and leave three, four, or five plants in a hill, according to the strength of the soil, and the preparation of it for the crop. Much greater crops may be obtained by planting in drills, but the labor is more, and often as laborers are changed in this country, it is not a light task to indoctrinate them in the proper culture in drills. Whatever manner of planting be adopted, if an extraordinary crop be desired, we should plant a double quantity of seed and, in the early part of summer pull up the least thrifty plants, leaving only such number as we think the soil will carry to perfection.

It is with plants as with animals, some having apparently the same means of nourishment and growth will be dwarfish and mar the appearance of the field or flock; by the removal of the least thrifty and promising ones, we not only improve the appearance of the field and flock, but leave a greater amount of room for the most vigorous.

The purest seed we can possibly obtain will produce some unthrifty plants, yet we can effect much to lessen the importance of using a double quantity of seed, and afterwards thinning. The most effectual method of securing pure seed is to pass through the field when the corn begins to ripen, and mark the most forward and perfectly formed ears, in such manner that we can distinguish them at harvest, and reserve for seed. This is a better method than that which has long been in practice with many good farmers, of selecting their seed corn, while husking the crop, from the most fruitful stalks and the largest ears. In this selection we are liable to take many ears which were late in ripening, and produce an effect on the future crop, which it is desirable to avoid. This selection of seed corn, however, though not the best that can be practised, is far preferable to a selection from the crib, which is yet the practice of some farmers.

When there appears not much danger of depredations by birds, or insects, seed corn may be planted in its natural state; various preparations are recommended, some to hasten the growth of the corn, but most of them to prevent its destruction by birds and insects. For the latter purpose, some of the steps recommended may be useful; great caution, however, against the infusion of too much poisonous matter, and against suffering the corn to dry too much before planted. Corn planted, or shelled from the ear, is the most certain to vegetate evenly, and resort to any other preparation should be submitted to only in extraordinary cases.

Whether corn be planted by hand, or with a machine, we should endeavor to have it covered at the least an inch and a half deep, to secure sufficient moisture, and give it early firm hold in the soil. When the corn plants are about two inches high, the first dressing should be given. Some modern writers advise not to use the plough at all, in the culture of corn, stating that the cultivator, and harrow, will stir the ground deep enough. The writer thinks the plough is the most useful instrument, in the first dressing; let it run as near the first row as it can, without disturbing the plants; returning, pass it near the second row, forming a ridge between the rows through the field. This ridge should not be disturbed in the first hoeing;

at the second dressing let the cultivator run on the top of the ridge, which will partially level it; and again, at the third hoeing, when the surface will be smooth enough for a scythe to pass over it. Some have recommended sowing grass at the third hoeing, to avoid the exhausting influences of a white crop on the land, and in this view it would be unquestionably useful; but in experience, it is found difficult to sow grass seed evenly among corn, and difficult to cut the corn so near the ground that there will be no interruption from the butts in mowing the next year. Three dressings are regarded as sufficient for corn. In many fields it is left with only two, and the last of these performed in a hurried manner. The pressure of other business often drives farmers too early from the cornfields, to the great injury of the crops. The oftener the surface soil is stirred, the more healthy and vigorous will the corn plants be. If concentrated manure is used to increase the crop, it will prove most efficacious in application just before the last dressing of the corn. The most active operation of it will then take place, when the corn plants require the greatest amount of food. The cost of this kind of manure, the labor of applying it, and its transient influence on the soil, are subjects which farmers should deliberately consider, and well understand, before they subject themselves to much outlay in the purchase and use of guano, phosphates, or poudrette. The leading qualities of all these articles can be approached in composting manure on the farm, and what the farmer has himself manufactured he can employ with more certainty of success than any foreign materials, the composition of which is concealed from his view.

After the dressings, corn should remain undisturbed till harvest, if we wish to secure the greatest amount of well-ripened corn.

In certain seasons, however, there will be great loss on the fodder to let all remain till perfectly dry; the gain in the weight of the corn may not be a compensation for the injury to the fodder by rains and winds. The ancient practice of cutting off the top stalks about the middle of September, and feeding them out immediately to the cattle, or curing them for winter use, under certain circumstances, may properly be continued. We should be careful not to begin the work too early.

If it is done while the corn is quite soft, the hardening of it will be delayed, and the corn will always be lighter than that which is naturally and well ripened. The same caution is demanded when corn is cut at the ground in September, and stooked; if any of the ears are soft when this is done, they will ripen only in a shrivelled manner. This work is recommended to be done in prospect of an early autumnal frost; but while the corn is yet very soft, stooking is nearly as injurious as frost.

The most value in fodder is obtained in stooking; the most value in corn, to let all remain in the field till the corn is dry enough to put in the crib. It is a common error, when stalks are cut, to do it too early, and we often hurry the business of harvesting, at the risk of having the corn mould in crib. There are many circumstances which tend to make farmers negligent in the employment of art in the corn field. Without any special preparation, every field will yield some corn. Careless planting and culture will not be followed with so entire failure, as in the management of some other grains. But no grain crop can be increased to so great extent, in careful and judicious management, as Indian corn. Experimenters have shown the practicability of doubling and even trebling the usual amount obtained. This result is reached not exclusively by high manuring and judicious cultivation; but much depends on the number of plants, and the situation of them in the field. The late excellent farmer, Judge Buel, made numerous experiments to prove the most suitable number of plants to the acre, and formed a table showing the different products of different numbers of plants on the acre.

This table it would be well for farmers often to consult, as a guide in the manner of planting. It is therefore subjoined.

1. An acre in hills, 4 feet apart each way, making 2,722 hills, will produce 42 bushels and 16 quarts.

2. The same, 3 by 3 feet, making 4,840 hills, will produce 75 bushels and 20 quarts.

3. The same, 2 by $2\frac{1}{2}$ feet, making 5,808 hills, will produce 93 bushels and 28 quarts.

4. The same, at 3 feet, plants 6 inches apart in the drills, making 29,040 stalks, will produce 113 bushels and 14 quarts.

6. The same, in drills, 2 rows in a drill, 6 inches apart, and the plants 9 inches, and 3 feet 9 inches from centre of drill, thus: ˙.˙.˙.˙.˙ making 30,970 stalks, will produce 120 bushels and 31 quarts.

6. The same in drills, 3 rows in a drill, as above, 3 feet from centre of drill, thus: ˙.˙.˙.˙.˙ . . . . . . making 43,560 stalks, will produce 170 bushels and 5 quarts.

WORCESTER NORTH.

Statement of Solon Carter.

The lot on which the corn, offered for the society's premium for the best crop and the best variety, was raised, contains $271\frac{3}{10}$ rods. It is a clayey loam, very springy, called cold land. The crop of 1856–7 was grass, without manure. It was ploughed once in July, 1857, after the grass was removed, and twice in May, 1858; was harrowed three times, furrowed lightly both ways, manured with eighteen loads stable manure from the barn-cellar, spread before the spring ploughing, and twelve loads compost put in the hill, and covered with the hand-hoe; was planted June 1, with Randall & Jones' single corn planter, using seven quarts seed, which goes in my name.

The cultivation was as follows, viz.: As soon as the corn could be seen in the row it was ploughed, one furrow per row one way, with a small plough, these furrows crossed per row one way, with a small plough, these furrows crossed with a small harrow; when large enough to hoe, the horse-hoe was run through both ways, followed by the hand-hoe; before the second hoeing, which was early in July, it was thinned to four stalks per hill through the field, and worked with the horse-hoe as at the first hoeing, followed again by the hand-hoe; after haying, the horse-hoe went through again both ways, making four times during the season that the field has been worked between the rows, both ways, with the horse-hoe, harrow or plough. Last and least I went through the field and pulled what few weeds had escaped, leaving a clean field.

It was harvested October 28, and November 1, in the usual way, by cutting at the ground. The stover I did not weigh, but consider it a fair equivalent for the cost of harvesting.

Cost of ploughing, harrowing, &c.,	$16 00
manure,	48 00
seed and planting,	62
cultivation,	7 20
Total, exclusive of harvesting,	$71 82

Product, as ascertained by the committee, November 10: Thirty-eight pounds shelled corn per square rod, or 10,309 pounds the lot, equal to 184 bushels, or 108 bushels per acre, allowing fifty-six pounds per bushel.

It will be seen that I make no reserve in my estimate for the value of the manure for after crops, for really I do not know how to estimate it; and besides, if we reserve for manure, I do not see why we should not also make an allowance for the improvement of the land by ploughing and cultivating. Individuals estimate these matters so differently, I think it better to leave the whole subject in the hands of the committee, believing they will deal justly with the competitors.

[Note.—Mr. Carter repeated, on this field, his experiment of 1856, by harvesting three lots, of one hundred hills each, in three different ways. The date of harvesting, husking, and shelling being the same in each of the three lots.

After husking, the ears were spread about six inches deep, and so remained until shelled. The result was as follows:—

Lot No. 1.—Cut up whole and stooked.

Weight of ears, 189 lbs.; of corn, 139 lbs.; of cobs, 24 lbs.

Shrinkage, 26 lbs., or 14 per cent.

Lot No. 2.—Top stalks cut.

Weight of ears, 200 lbs.; of corn, 155 lbs.; of cobs, 26 lbs.

Shrinkage, 19 lbs., or 9½ per cent.

Lot No. 3.—Left standing whole.

Weight of ears, 196 lbs.; of corn, 141 lbs.; of cobs, 23 lbs.

Shrinkage, 32 lbs., or 16 per cent.

As in 1856, so now, the corn which had the top stalks cut weighed most at harvesting, and shrunk least before shelling.

The lots for the above trial were selected by Col. Phillips, when examining the field for the committee, of which he was chairman.]

WHEAT.

WORCESTER NORTH.

Statement of Solon Carter.

The lot on which my wheat was raised contains two acres and seventy-two and two-thirds rods. The soil is a clayey loam upon a subsoil of clay-pan, with occasional tight stones. The crop of 1856 was grass, without manure; that of 1857 corn, with about twenty-five loads* per acre of manure from my barn cellar. It was ploughed twice about the last of March, first by splitting the hills, two furrows per row; then ploughed fine, six to eight inches deep, harrowed once after splitting the hills; no manure was used. It was sowed broad cast, April 3, with two bushels per acre of coffee wheat, and was reaped July 28, bound and set in bunches of from twelve to sixteen sheaves each, and covered with cloth caps; in this situation it remained ten or twelve days, when it was put in the barn.

Cost of ploughing, &c., per acre, ...	$3 50
seed and sowing, ...	4 00
harvesting, ...	6 50
Total, per acre, . . .	$14 00

Product, 2,240 lbs., or 37⅓ bushels; of 60 pounds per bushel.

RYE.

BARNSTABLE.

Statement of Zenas D. Basset.

The land on which this crop was raised measured one and a quarter acres. The soil is light, having recently been cleared of pitch pines. The land had been in grass for two previous years. In 1857 about half the lot was planted with potatoes in May, and after harvesting, the whole lot had about fifteen

* A load is so indefinite that it is not possible to judge how the land was manured, and hence all such statements are of little value.

tons of manure spread on it, and was ploughed and sowed with one and a quarter bushels rye, with grass seed, on the 22d September, 1857. The rye was harvested and produced thirty and one-half bushels by weight, and two and one-fourth tons straw.

Value of the crop:—

$31\frac{3}{4}$ measured bushels, at $1,		$31 75
$2\frac{1}{4}$ tons straw, at $7.50,		16 87
		$48 62
Expenses:—		
Ploughing,	$3 75	
Seed Rye,	1 25	
Harrowing,	75	
Reaping,	3 00	
Threshing,	3 00	
Manure,	15 00	
		$26 75
Profit, (charging all manure to this crop,)		$21 87

September 16, 1858.

BARLEY.

BARNSTABLE.

Statement of Thomas Harris.

My crop of barley was on a mixed loam, containing one acre. It was planted with corn in 1857, and manured with barnyard manure and sea-weed, ploughed under to the depth of six inches. On the 19th April, 1858, I ploughed about same depth and sowed 200 lbs. Peruvian guano on the furrow, harrowed it in, and sowed two bushels of two-rowed barley, which was thoroughly cross-harrowed in. Harvested about the 25th July. The crop weighed 1,500 lbs., or thirty-two bushels, and twenty-eight pounds, at forty-six pounds the bushel. The cost was as follows:—

Ploughing, ...	$3 00
200 lbs. guano, ...	6 00
2 bushels seed, ...	2 00
Harrowing, &c., ...	3 00
Harvesting, ...	6 25
	$20 25
Value of barley and straw, ...	38 60

OATS.

WORCESTER NORTH.

Statement of John Brooks, Jr.

The acre on which my oats grew is a light soil with a clay subsoil. The crop of 1856 was corn, with fifteen loads of 32 bushels compost manure and 100 lbs. guano, that of 1857, potatoes, with fifteen loads of cow manure. It was ploughed once May 10th, about eight inches deep, manured with fifteen loads of horse manure, and 150 lbs. guano spread and harrowed in; sowed broad cast, May 10th, with three bushels Hungarian oats, and reaped Aug. 15th. They lodged very much, and I was obliged to harvest them before they were ripe.

Cost of ploughing and harrowing, ...	$3 00
manure and guano, ...	19 50
seed and sowing, ...	1 62
Total, exclusive of harvesting, . .	$24 12

The threshing cost every tenth bushel.

Product, as ascertained by the committee, November 1st, ten pounds, fifteen ounces per square rod, or 1,750 pounds the acre, or $54\frac{11}{16}$ bushels of 32 pounds, but actually measuring 70 bushels the acre.

BARNSTABLE.

Statement of Frederick Parker.

The acre of land on which my oats were raised is a heavy loam, partly clay. It had a heavy coat of manure in 1857, and was planted to corn. About the first of April last I ploughed without manuring, as I do not approve manuring spring grain where the land has been previously highly manured. On the 9th of April I sowed two and one-half bushels of oats, and harrowed three times, one before and twice after sowing. They were harvested about the first of August, but just previous, a heavy rain beat them down, and so broke the straw, that it was impossible to harvest them clean; some had to be mowed. I judged at the time that I lost ten bushels by the storm. The land was just one acre, and worth about $50 per acre.

Value of crop:—

49 bushels oats, at 60 cents,		$29 40
$1\frac{1}{2}$ tons straw, at $7,		10 50
		$39 90
Expenses:—		
Ploughing, sowing and harrowing,	$4 00	
$2\frac{1}{2}$ bushels seed oats,	1 25	
Harvesting,	2 00	
Threshing,	3 00	
Profit,	29 65	
		$39 90

BROOMCORN.

HAMPSHIRE, FRANKLIN AND HAMPDEN.

Statement of James Porter.

The ground on which the broomcorn was raised, which I offer for a premium, lies near the Connecticut River, in South Meadow. It has for thirty years or more, been under the cultivation of the plough, with either wheat, Indian, or broomcorn

crop on it. Broomcorn was raised on this piece of ground, in 1855 and '56. In the fall of 1856, the stalks were ploughed under, and sowed with wheat. The wheat crop was light. The spring of 1858, I ploughed under long manure to the value of $21, including labor of application, with a heavy growth of clover. It was planted the fifteenth day of May, with Billings' Planter, the hills being three feet by two feet and two inches apart. The ground was rolled before harrowing and after planting. It was hoed four times, and harvested the first of October. Owing to the frost, the seed was not fully ripe.

The ground measured two acres and five rods.

The yield was of brush, 2,215 lbs. Seed, 100 bushels.

Value of crop :—		
2,215 lbs. of brush, at 7 cents, .	$155 05	
100 bushels of broom seed, at 30 cents,	30 00	
		$185 05
Expenses :—		
Ploughing, ...	$3 50	
Manure and applying, ...	21 00	
Rolling and harrowing, ...	2 00	
Planting and seed, ...	1 00	
Hoeing, ...	16 00	
Harvesting and scraping, ...	19 00	
Interest on land, ...	20 00	
		$82 50
In favor of the crop, ...		$102 55

HATFIELD, November, 1858.

CRANBERRIES.

BRISTOL.

Statement of Joseph M. Newcomb.

The meadow on which my crop of cranberries was raised was formerly covered with scattered patches of unfruitful vines, but for some years I have been accustomed to flow it yearly and have spread upon it two coats of sand each in the

proportion of one load to the rod, three years intervening between the two coats.

This treatment has rendered it productive. Last year the vines flourished well, but they bore only five bushels of cranberries. This year the season was unfavorable and about one-third of the crop was destroyed by the worms. The berries were gathered about the 20th of September. Below is a statement of their value and the expense.

Value of crop:—		
9 barrels cranberries at $11.68, . .	$105 12	
600 lbs. of grass, ...	3 00	
		$108 12
Expenses:—		
Raking and picking after, . . .	$5 40	
Picking over for market, . . .	1 00	
9 barrels at 14 cents, ...	1 26	
Interest on land and taxes, . . .	3 37	
		11 03
Net profit, ...		$97 09

BEANS.

Statement of Elbridge G. Dean, of Taunton.

The quantity of land was one quarter of an acre, which, last year, was part in grass and part to corn. The manure used this year was one cord of barnyard manure, spread and ploughed in. Planted in drills two feet apart about the 30th of May. Four beans in a hill, the hills being about one foot apart in the furrows. Weeded the last of June. Harvested and threshed in the usual manner about the 14th of September. The amount of product was $9\frac{1}{60}$ bushels. The beans were large white marrowfat, which sold for $2.50 per bushel, . $22 54

Expenses:—	
Ploughing, drawing manure and spreading,	$1 00
Harrowing and furrowing, . . .	50

1 cord compost manure,	$4 00	
Seed and planting,	1 25	
Hoeing,	75	
Harvesting and threshing,	1 50	
		$9 00

Statement of George R. Leonard, of Norton.

The land was high and sandy, having a level surface. Last year the land was planted to potatoes, and the condition of the land had been much improved by previous cultivation. The manure used the present year was 1 barrel of poudrette. Ploughed, furrowed, planted June 10th, with small white bush bean. Furrowed about 18 inches apart. Four beans were dropped in a place, in the furrows, about 8 inches apart, and about a table-spoonful of poudrette applied to each hill. Hoed the first time, June 30th, second time, July 14th. They were pulled and laid on rails to dry the last of September, threshed the last of October, and weighed on the 27th of November. Weight 458 lbs. or $7\frac{38}{60}$ bushels of 60 lbs. each.

Value at $2 per bushel,	$15 00	
Fodder,	2 00	
		$17 00

ROOT CROPS.

MASSACHUSETTS.

ESSAY ON THE MANGOLD WURZEL.

BY JOHN TYNAN, OF IRELAND.

Mangold Wurzel, or, as it is often called, "Mangel Wurzel," which signifies "root of scarcity," has been, like all our cultivated green crops, obtained by culture from the original wild species.

Botanically considered, the Mangold Wurzel, (*Beta Vulgaris Campestris*), or, as it is sometimes called, "field beet," is a species belonging to the genus *Beta*, which is contained in the

class *Pentandria*, and order *Digynia* of the Linnean system of classification, and in the order *Chenopodea* of the natural system.

It was introduced into Great Britain from the Continent of Europe at no very remote period; but the precise time is not easily ascertained, as a considerable diversity of opinion exists amongst authors on this point; probably it was the year 1773, as would appear from the following extract, taken from *The Penny Cyclopædia of the Society for the Diffusion of Useful Knowledge*:—"The common field-beet for cattle, which has been long known in Germany, was introduced into England at the latter end of the last century," to which it may be proper to add, "and its introduction is generally attributed to the late Dr. Letsom, a physician of great reputation, and one of the Society of Friends." At its first introduction it was grown only by a few enterprising gentlemen, but it gradually extended, and subsequently found its way into this country, where it was, (like the potato at its first introduction,) for a long time looked on as a curiosity, rather than cultivated as a useful auxiliary to cattle feeding. At length the success which attended its cultivation by a few individuals who ventured to give it a trial, induced others to follow their example, and it thus gradually, but steadily progressed, till, at the present day, it holds such a place in the green cropping of this country, as no longer to deserve the title of root of scarcity; but, at the same time, is not yet cultivated to such an extent as its merits seem to entitle it.

Climate and Soil.—It is capable of accommodating itself to a great range of climate, flourishing in Europe, between the parallels of 46° and 56° north latitude, (if the situation be not too bleak or exposed,) fair crops having been raised in the latter latitude in Scotland: but the climate which is considered to be best suited to it is that of the south of England, where frosts do not set in early, and which has a high summer temperature. In this country, where the summers are not so warm as in England, though enjoying a mild and genial climate, with a more moist and humid atmosphere, large crops have been obtained. "Local climate," says Professor Johnson, "modifies very much the relative quantities of the same crops obtained in different localities. Thus, in the southern part of Wigtonshire,

30 tons of Swedes, 20 tons of Mangold, and 20 tons of White Carrots per acre, are equivalent crops, while in Berkshire, it is as easy to grow 30 tons of Mangold as 20 tons of Swedes per acre."—*Elements of Agricultural Chemistry*, p. 341.

It likewise adapts itself to a great variety of soils, having been grown in this country on nearly all descriptions of land, yielding remunerative crops even on light soils, provided they be not too light and gravelly, and on clays that are not of too stiff a texture; it will, however, yield fair crops on clays too stiff for turnips; but it attains its greatest perfection, and yields its maximum produce only, on a deep friable loam, in good condition, and which contains a considerable quantity of vegetable or organic matter, with a sound, dry subsoil, and in a situation not too exposed. It also yields very heavy crops on reclaimed bog-land, rendered sound and dry by judicious improvement.

"It is suited," says Mr. Bond, "to our dry climate. It will grow as well on the stiff soils as upon the light; it is peculiarly a heavy land root; its early maturity suits the retentive soil, as it can be harvested before the wet season sets in, and its keeping property renders it invaluable, especially on such lands, because of the lateness of the growth of the grass for food in spring.—*Farmer's Magazine.*

Varieties as Adapted to the Different Soils.—Like all our cultivated crops, many varieties of the Mangold Wurzel have been obtained by hybridization and other processes in connection with vegetable physiology, and which, if not produced by art, will often be effected by nature. Though there are many varieties produced in this way, yet there are only a few comparatively speaking, extensively cultivated, the principal being the Long Red, Long Yellow, and Long Orange, and the Orange, Yellow, and Red Globes. Where the land is deep and heavy, or of a peaty character, the long varieties are best suited, but when of a lighter texture, the Globes are to be preferred.

Having now described the properties of the Long and Globe varieties when considered in relation to soils, the question would naturally suggest itself to the reader—What are the comparative merits of the respective varieties of each sort, as, for instance, the Red, Yellow, and Orange Globes? This is a question very often asked, but it is one to which no very

accurate answer can be given, as there are instances where the produce of the Red exceeded that of the others, and so of the Yellow and Orange, even on the same land. These variations must be attributed to many circumstances, such as changes taking place in the soil, climate, manures, &c., which in most instances, cannot be defined. The Orange variety, however, appears to yield the best crops, and adapts itself to the greatest range of soils.* The same observations may be made with respect to the long varieties, amongst which the Red holds the same position as the Orange amongst the Globe varieties. The Silesian, or Sugar beet, is another variety, but as its produce is generally much inferior to any of the other sorts, it is scarcely ever cultivated as a direct food for cattle. On the Continent of Europe, it is in some places—as for instance, France—grown largely for the manufacture of sugar.

With these preliminary observations, nothing now remains but to enter upon its cultivation, and the first subject which presents itself for consideration is the

Preparation of the Soil.—Being a green crop, its place in most rotations is after a corn crop. Assuming then, that the land is in stubble, in autumn, and either thorough-drained or naturally dry, it is to be treated in precisely the same manner as if preparing for any other green crop. The land, whether autumn cleaning is carried out or not (if it be, so much the better,) is to receive a deep ploughing in autumn or early winter. As this crop, of all others, requires deep culture, if the field intended for it has not been recently subsoiled, and the soil and subsoil suited for this operation, it should be performed now, the subsoil plough following in the track of the common plough, and in this way the land is thrown over with a good rough furrow, leaving a large surface to the ameliorating influence of the winter weather. It is a common practice with many farmers to plough in the farmyard manures intended for the crop, at this season; and if the land be well suited for autumn manuring, it will not only materially forward the spring

* On this (the Albert Model farm,) where the soil is a rich loam, containing a large amount of organic matter (over 14 per cent.,) and which is well suited to the growth of Mangolds, carefully conducted experiments for several years past, have shown that the Orange Globe invariably yields the largest and best crops.

work, but also the constituents of the manure will be in a very available state at the time the young crop requires them, besides being intimately incorporated with the soil by the subsequent operations performed on it. The land having been ploughed up in a rough state in autumn, or early winter, as before mentioned, may be allowed to remain so till the following spring, when it should receive a harrowing to destroy any seedling weeds that may be springing up. When the sowing season approaches, the land should be cross-ploughed, harrowed, and rolled, and afterwards repeatedly grubbed, harrowed, and rolled till it be reduced to a fine state of tilth. After each harrowing, all weeds should be carefully collected and removed, and the proper cleaning of the ground, previous to the sowing of all kinds of green crops, cannot be too strongly inculcated. The number of ploughings, grubbings, &c., necessary to be given in order to obtain the required degree of pulverization, depends on the nature of the soil and its previous treatment; where the soil is naturally loose and friable, a single ploughing with one or two operations of the two-horse grubber, will suffice; but where it is of a more tenacious character, the labor will proportionately increase. When the desired degree of pulverization has been effected, it is to be finally rolled and drilled.

In those districts where the climate is very dry, and the soil also dry and light, and liable to become destitute of a sufficiency of moisture for the growth of the young crop during the summer months, green crops are usually grown on the "flat;" but in this, or any other country possessing a humid atmosphere, and consequently little danger of the above results, the raise-drill system is to be recommended, and is almost universally adopted.

The land being prepared as above described, drills should be opened, twenty-seven to thirty inches apart, with the double mould board plough, or, if it be not at hand, the common plough must be used. If the manure had not been applied, in autumn, it should at least have been carted out during the winter months to some convenient place closely adjoining the field intended for the crop, in order to facilitate the application of it now. When the drills are opened the manure should be immediately deposited in quantity proportionate to the requirements of the land, all lumps well broken and divided, and

evenly spread in the bottom of the drills, and at once covered in, and the seed sown. No more drills should be opened at a time than can be manured, covered in, and sown on the same day; for, by an adherence to this principle, a great portion of the fertilizing ingredients of the manure is preserved from loss by exposure to the atmosphere, and the seed being sown in the fresh earth, germination is materially assisted, circumstances on which the secret of successful cultivation in a great measure depends.

Manure.—Of all the manures employed in the production of any crop, farmyard manure may be considered the staple, but particularly so for the Mangold, of which large crops are raised by its aid alone; good crops have been also grown, where the soil is naturally rich, by the application of guano, vitriolized bones, and other artificial or special manures, or, where a sufficiency of farmyard manure is not to be had, the deficiency may be made up by the use of extraneous manures, and in such proportion as circumstances may require.*

The farmyard manure, whether alone or in conjunction, should be very well decomposed, and well mixed by turning, before its application in spring. The quantity applied should be commensurate with the requirements of the soil; but to land of average fertility, 25 tons per statute acre, when applied alone, would be sufficient. If extraneous manures be used alone, 5 cwt. of guano, or 7 cwt. of vitriolized bones, would be a fair application; it is not advisable, however, to raise Mangolds with these manures alone, where farmyard manure can conveniently be obtained, unless the soil be very rich. A dressing of common salt, is highly beneficial to this crop; whether it produces its effects by acting directly on the crop, or indirectly by rendering available some constituents of the manure or soil, or whether they may be attributed to both, is not well known, but it has been ascertained, by chemical analysis, that the ash of both tops and bulbs contains a large amount of common salt. The quantity of common salt contained in the Mangold is so large as to be quite perceptible to the taste in the growing plant, especially

* On light chalky soils, a mixture of guano, nitrate of soda, and common salt, at the rate of 2 cwt. each per acre, has been found very efficacious in the growth of Mangold Wurzel.—*Nesbit's Agricultural Chemistry*, p. 100.

the leaf; the amount of sugar contained in the bulb counteracts the taste of the salt in *it*. Though a moderate application of common salt is found to increase the produce, yet too large an application is not attended with similar beneficial results, as appears from experiments made on this farm* during the present year, for the purpose of ascertaining the efficacy of common salt on the Mangold crop, in both large and moderate quantities. The following table is quite sufficient to illustrate this. All the circumstances connected with the cultivation were precisely similar, except in the case of the salt applied.†

Variety of Mangold Wurzel.	Quantity of Manure per Statute Acre.		Produce per Statute Acre of Bulbs.	
	Farm-Yard. Manure	Common Salt.		
	Tons.	Cwt.	Tons.	Cwt.
Orange Globe, .	18	–	30	10
Orange Globe, .	18	7	32	6
Orange Globe, .	18	14	31	17

The best mode of applying the salt is to scatter it over the manure when spread in the bottom of the drill, and by this means there is no danger of its coming into contact with the seed, the vitality of which it would otherwise destroy. When any other of the extraneous manures are used with the farm-yard dung, they may be applied in the same manner, or spread along at the back of the first bout of the plough when the drill is being formed, and is covered in by the second bout, which completes the drills. By this latter mode it will be nearer to the young plant when the seed has vegetated, and therefore

* I may be permitted to remark, that the various experiments conducted on the Albert Farm are very correct and perfectly reliable, as great care and attention are exercised in carrying them out; besides being generally conducted on a pretty large scale, and the *entire* produce weighed, there is no danger of those errors which so frequently occur from the present system so generally adopted for ascertaining the acreable produce.

† Mr. Austen, of Chitworth, near Guilford, who farms on the green sand, has informed me, that with common salt alone on his land, he has succeeded in growing an excellent crop of Mangold Wurzel, by applying it after the plant was up, in successive doses of 2 cwt. per acre up to 6 or 8 cwt. Every fresh application appeared to give the crop a new start.—*Johnston's Experimental Agriculture*, p. 63.

will be sooner available. There are various modes of applying them, but in all cases care must be taken that they do not come into contact with the seed, as, like the salt, they have all a tendency to destroy its vitality.

In the summer of 1856, Mr. Caird, M. P., had an interesting series of experiments carefully carried out on his farm in Kent, with the view of ascertaining "the kind of manure which, at the least cost, will produce the greatest effect" on the mangold wurzel crop.

The following table gives the quantities and cost of the different manures, the produce of each plot, &c.:—

No. of Lots.	Kind and Quantity of Manure, per Acre.	Cost per Cubic Yard or Cwt.	Total Cost of Manure, per Acre. £ s. d.	Produce, per Acre. Tons. Cwts.
1	20 cubic yards o Dung, 4 cwt. Guano,	3s. 6d. per yard. 12s. 0d. per cwt.	5 18 0	23 16
2	20 cubic yards of Dung, 4 cwt. Guano, 5 cwt. Salt,	3s. 6d. per yard. 12s. 0d. per cwt. 1s. 6d. "	6 5 6	30 12
3	20 cubic yards of Dung, 1 cwt. Guano, 1 cwt. Super-phosphate, 1 cwt. Nitro-phosphate, 2 cwt. Salt,	3s. 6d. per yard. 12s. 0d. " 7s. 0d. " 6s. 6d. " 1s. 6d. "	4 18 6	25 10
4	40 cubic yards of Dung,	3s. 6d. per yard.	7 0 0	21 3
5	2 cwt. Guano, 2 cwt. Super-phosphate, 2 cwt. Nitro-phosphate, 2 cwt. Salt,	12s. 0d. per cwt. 7s. 0d. " 6s. 6d. " 1s. 6d. "	2 14 0	20 6
6	7½ cwt. Guano,	12s. 0d. "	4 10 0	17 17
7	12 cwt. Super-phosphate,	7s. 0d. "	4 4 0	14 19
8	12 cwt. Nitro-phosphate,	6s. 6d. "	3 18 0	15 6
9	1⅓ cwt. Guano, 1⅓ cwt. Super-phosphate, 1⅓ cwt. Nitro-phosphate, 1⅓ cwt. Salt,	12s. 0d. " 7s. 0d. " 6s. 6d. " 1s. 6d. "	1 16 0	19 11
10	5 cwt. Guano,	12s. 0d. "	3 0 0	12 15
11	8 cwt. Super-phosphate,	7s. 0d. "	2 16 0	11 18
12	8 cwt. Nitro-phosphate,	6s. 6d. "	2 12 0	12 11

Each plot occupied the tenth part of an acre—each containing three rows of roots—the middle one of which was weighed in testing the results. "It will be seen that in every instance where *salt* forms an ingredient of the manure the produce is increased."

Time and Mode of Sowing.—The season for sowing the mangold wurzel, in this climate, (Ireland) is from the middle of

April to the middle of May; but the last week in April is considered the best time. If sown too early, the liability of the plants to start to seed during growth, the greatest evil attending their cultivation, is increased; if too late, the crop remains in a backward state during the growing season, and never attains its full perfection, especially if dry weather set in immediately after sowing.

Mr. Miles, M. P., in a paper on the "cultivation of mangold wurzel," in vol. ii. of the *Journal of the Royal Agricultural Society of England*, says: "The earlier in April your mangold wurzel is sown the better; the deeper the tilth the greater probability of a heavy crop." And a recent writer in the same journal (Mr. Paget, of Ruddington Grange, near Nottingham,) states: "The best seed-time in this locality is, in my opinion, from April 7th to April 10th. It is useless, in general to sow it earlier, because the temperature is, I think, too low for the germination of the seed. My experiments do not lead me to believe that this comparatively early sowing produces many more 'runners,' and our summers are too short to admit of unnecessary delay in sowing." (Vol. xiii. p. 405.)

When, however, through any cause the seed cannot be got in at the proper time, by steeping it in sand or earth moistened with water, or in dilute liquid manure for three or four days, germination will be so far promoted that it will be equivalent to having it, at least, the same time sown. Indeed, many persons recommend the steeping of the seed in all cases, but it is not always safe to do so, for should dry weather occur after sowing, the germination thus artificially produced receives a check which often proves fatal or injurious.

The drills being opened, the manure spread and covered by splitting the drills with the double mould-board plough, the drills thus formed should have their tops slightly levelled by a very light roller, and the seed sown either in a continuous line along the crown of the drills, or deposited in tufts or bunches at the distance apart which the plants are intended to be left at the time of thinning. Owing to the peculiar construction of the pericarp, in which the true seeds are contained, no sowing machine has hitherto been generally employed. If, however, an efficient machine be available, it is, by all means, to be recommended; but in the absence of such, the hand and common

hand-hoe, or dibble, are efficient, though rather slow substitutes. Under these circumstances, the method most commonly practised, and which is most to be recommended, is with the hand-hoe to open holes at the required distance apart, and from an inch and a half to two inches in depth; another person follows and drops three or four capsules (or, as they are commonly called, seeds) in each hole, followed by a third, who, with a spade, shovel, rake, or any other convenient implement, draws a sufficiency of mould over the seeds to cover them to a depth proportionate to the texture of the soil, the average being about an inch and a half; but if the soil be of a light nature, and the weather dry, two inches would not be too deep. By this mode of sowing, three careful boys, women, or girls, would sow at least an acre in a day. About six pounds of seed per statute acre is the quantity usually sown, which, if not saved on the farm, should be procured from a respectable and trustworthy seed merchant, in order to insure what is genuine, as great losses are often sustained by farmers from purchasing cheap but bad seed.*

In forming holes for the seed, the dibble is sometimes employed, which makes from four to six holes at a time by a single pressure of the foot, and is much more expeditious than the hoe; but it has been objected to for two reasons; the first and more important is, that the holes are too small, and the seeds when put in fall together, and consequently grow up intertwined with each other, which is very injurious to their early growth, and troublesome at the time of thinning; the other is, that the soil immediately about the seed is consolidated, instead of having that loose texture which is so essential for promoting the growth of the minute and tender roots. These objections may, in a great part be obviated when the teeth of the dibble are made pretty large and the soil light and friable. In sowing the seed, it is well to bear in mind what has been previously said when treating of the varieties as suited to the various classes of soils. In addition to this, it may not be out of place

* I have found that sowing too deeply is more to be guarded against than the opposite; an inch is quite sufficient depth for the seed sown early in the month of May. Steeping the seed for 24 hours in water insures a rapid germination, and does not prevent sowing by a drill, if, before sowing, the seed is shaken up slightly in a bag containing a little dry sand.—R. S. F.

to insert here a table of the produce yielded by the different varieties grown this year on this farm, though, at the same time, similar results are not to be expected in all climates or classes of soils. The description of soil has been alluded to in a note at a preceding part of this essay; the manuring and all things else connected with the cultivation were, in each case, the same, and the following are the results :—

Variety of Mangold Wurzel.	Produce per Statute Acre.	
	Tons.	Cwt.
Orange Globe, ...	32	6
Deep Orange Globe, ...	29	18
Long Red, ...	28	15
Long Yellow, ...	28	14
Red Globe, ...	26	14
Sugar Beet, ...	30	12

It is surprising to observe the extraordinary produce of the sugar beet, being superior to most of the varieties of mangold, while in ordinary cases it averages about three-fourths the produce of the mangold, or about eighteen tons per acre.

After Culture.—Like the turnip, the after culture of the mangold wurzel may be said to consist in timely and careful thinning, attentive weeding, and keeping the soil in a loose and friable state by means of the drill-grubber, drill-harrow, and hand-hoe. But, to be more particular, the young seedling plants will appear above ground in about ten days after sowing, —sooner or later, as circumstances are favorable or otherwise; and when sufficiently advanced, the drill-grubber, or, where the land is tolerably loose, the drill-harrow, should be run between the drills to destroy whatever weeds may be growing, and at the same time to assist in tilling the soil. When the plants show a pretty strong leaf, and before there is any danger of injury from allowing them to grow up too strongly, thinning and weeding should commence. If the seed had been sown in a continuous line by machine or otherwise, this operation may be performed by the hand-hoe, taking care to allow the strongest

and healthiest plant to remain. The distance apart at which the plants are to be left is determined by the size they are expected to attain. Where the soil is rich and every thing favorable to their growth, the greatest space is allowed. When the seed was sown in tufts or bunches, the hand must necessarily be used in thinning, and the distance determined at the time of sowing; from twelve to sixteen inches are usually allowed. In thinning, the plants must not be completely singled out at the first operation; it is better to allow two of the healthiest and strongest to remain together, and at the final thinning, which takes place in about a month afterwards, the more promising plant should be left. This plan is most necessary to be adopted to prevent the losses which otherwise are likely to happen, by many of the plants starting to seed, and which is materially checked by having the one which presents symptoms of seeding* pulled, and the other left to grow.

As the thinning proceeds, any blanks that may occur should be filled up by transplanting; this is the only case in which the transplanting of mangolds is to be recommended; and even then, unless the weather be favorable and the operation very carefully performed, the result will not be very successful. Moist weather is the most suitable for this purpose, and the best way to proceed is to open a hole with the spade, where the blank occurs, large enough to receive the whole tuft of plants with as much clay as can be raised about them. When deposited in the hole, the clump must be carefully firmed, and all the plants then drawn out, except the one intended to be left. This method of transplanting cannot be practised with the thinnings of the crop, as the entire bunch must be used; therefore, at the time of sowing it is necessary to sow a small plot in some convenient place for the special purpose of transplanting, and by observing the above conditions a fair return may be expected.

When weeds are again beginning to appear, after the first thinning and weeding, the crop should be hand-hoed, and again grubbed and drill-harrowed. In hoeing, great care must be

* The principal symptoms indicative of a plant likely to run to seed are:— The heart of the tuft of leaves appears high and forward, thus evincing a tendency to produce a seed stalk; there is also an absence of that healthy succulency observable in a better-disposed plant.

taken that none of the plants be disturbed or in the least degree injured, as the slightest wound inflicted on them in the young state increases during growth, producing a kind of canker in the part, which not only presents a very unsightly appearance, but also greatly injures the value of the bulb, no other of our green crops being so susceptible to injury. In drill-grubbing and harrowing there exists no danger of injury, provided the implements be properly adjusted and carefully employed; but in all the operations great care must be exercised.

Another hand-hoeing and drill-grubbing should be given some time before the crop is so far advanced as to render it unsafe to work amongst it.

In conducting the after culture of the crop, it is well to keep in mind that the number of operations need not be restricted to those above mentioned, for when the soil is a strong one more will be required to keep it in a loose state, to admit of the passage of the minute spongioles and delicate fibres in search of food; but on average soils those enumerated are sufficient.

Regarding the propriety of divesting the plants of a portion of their leaves, so much practised in many places, and which yields such a large supply of valuable feeding at a time when other green food is scarce, different opinions are entertained; but there is no disputing the fact that if they be removed too early, while in a succulent and active state, the produce of the growing crop will be diminished, which will appear to be an evident and unavoidable result, when we reflect on the important functions performed by the leaves of plants. On the other hand, if the leaves be not removed till they are observed to droop or flag, showing by their appearance that they are no longer actively employed in performing their special and valuable functions, then they may be removed with safety. The first removal of the leaves may commence towards the middle of September, when those exhibiting the above appearances should be collected, and a fresh supply for a second gathering will be ready towards the middle of October. By this means a large quantity of excellent cattle-feeding may be obtained, which would otherwise be either lost or come in at a period when it would not be of half its value, other feeding being

then plenty. The value of mangold leaves as a food for milch cows stands high amongst green fodder, as tested by a series of carefully-conducted experiments made at this (the Albert) institution, of which the following table shows the results:

No.	Date of Experiment.	Kind of Feeding.	Butter produced by 40 quarts of Milk.	
	1857.		lbs.	ozs.
1	4th May.	Italian Rye Grass alone, . .	3	5
2	5th Sept.	Italian Rye Grass and Pasture, .	3	13
3	28th Sept.	Mangold Leaves and Pasture, .	3	14
4	6th Oct.	Mangold Leaves alone, . .	4	–

The mangold leaves are very much relished by milch cattle, and from six to eight stones * per day in alternate feeds, with hay or straw, is a good allowance for an ordinary sized beast.

"The leaves of the plant," remarks Professor Wilson, "also appear to possess a far higher value, both as a feeding and as a manuring substance, than we are accustomed to assign to them. Boussingault (Annales de Chimie) gives us an organic analysis of the roots and the leaves, of the plants; a comparison between their respective compositions will be very much in favor of the leaves for the purposes just mentioned. The substances were dried necessarily previous to their analysis.

Their proportions of water were about the same, and their elementary composition was as follows:—

	Root.	Root.	Leaves.
Carbon, ...	42.75	42.93	38.1
Hydrogen, ...	5.77	5.94	5.1
Oxygen, ...	43.58	43.23	30.8
Nitrogen, ...	1.66	1.66	4.5
Ash, ...	6.24	6.24	21.5

* A stone is 14 lbs. weight.

Thus showing that, in a chemical point of view, the leaves were three times as valuable as the same weight of roots would be."—*Journal of the Royal Agricultural Society of England*, Vol. xiii. p. 160.

Storing.—About the beginning of November* the crop will have arrived at maturity, and then no time should be lost in getting it into the farmyard, as should frost occur the bulbs are liable to be injured severely. The opportunity of dry weather should, if possible, be seized upon for this purpose, even should it occur in the end of October, for it is only in dry weather this can be done without injury to the land, whilst the crop will thus be taken up in the best state for securing its safe keeping, even to a late period of the following season. Having selected a convenient place for storing the bulbs, the operations of pulling, topping, carting, &c., should commence and proceed with all possible dispatch. The bulbs growing in every four drills should be placed together in the hollow space between the two middle ones, and by this means the carts can pass between two rows, and be filled from both at the same time; the leaves may be thrown in heaps also, in such a manner as not to interfere with the carting. In topping, i. e., taking off the leaves, a sharp knife or sickle may be used, but the utmost caution must be taken that the tops be not severed so close to the bulb as to wound it, as should it happen to be cut, the juice or sap exudes through the wound, and not only is a great part of its nutritive properties thus lost, but it is also very liable to decay. To avoid this danger, many persons have the tops twisted off with the hand, which performs the work very expeditiously. No more should be pulled and topped in the field than can be carted in and stored the same day, for should frost occur over night the denuded bulbs will suffer severely, while if standing and protected by their broad leaves, its effects will be greatly lessened. If any unavoidably happen to be left out, they may be kept safe by making into heaps and covering them with the leaves. Should any, however, be frozen,

* The harvesting of the beet in Massachusetts should commence a month earlier, say in the first and second weeks of October, and stored before the other root crops. This happens to be, fortunately, the most convenient order for harvesting with respect to future use, as the beet root is not wanted until after the turnip, carrot, and other root crops are exhausted.—R. S. F.

by unavoidable exposure, they should be kept separate, and consumed as soon as possible, as they will not keep for any length of time.

In selecting a place for storing, if a wall with a northern aspect and dry situation be at hand, nothing better can be desired than to store them up against it neatly, making the heap about six feet wide at the base, and sloping up against the wall to the height of six or seven feet. When this method of storing is not convenient, the bulbs may be built into roof-shaped heaps, about six feet in width at the base, and five feet in height, in a dry place. Another very good way to store them, is to build two dry stone walls, parallel to each other, sufficiently distant to allow a cart to pass between them, about four feet high, and of any required length. Hurdles may be substituted for stone walls, and inclosures made by brush-wood, &c., when found more convenient. Into these inclosed spaces the bulbs are put and piled up, terminating in a ridge. The latter method of storing is a good means of economizing space; and if it be adopted, the dry stone walls, (if hurdles, &c., be not used in their stead,) require to be plastered or dashed with mortar, to prevent frost from entering the crevices. Whatever mode of storing is adopted, the same great object is to be kept in view, viz.:—the safety of the crop by preserving it from frost and wet, by carefully thatching as quickly as the heap is made, and making provision for the removal of all wetness caused by rain or otherwise. Being carefully stored, thatched and kept dry, the mangolds may be preserved in a sound state till midsummer, if required, and even longer, with their feeding properties little impaired, especially if the heap be turned over in spring, and any young shoots rubbed off, besides removing any decayed roots.

Produce.—The produce varies with the climate, soil, season, manuring, care bestowed on cultivation, &c. Where all these are favorable, over forty tons per acre have been obtained; but twenty to twenty-five tons may be considered as the average, and twenty-five to thirty tons may be reckoned a good crop.

The mangold wurzel is less variable in its produce than the turnip, not being so liable to casualties during its growth; the principal ones to which the former are liable, are the occurrence of occasional blanks, owing to the failure of the seed in

germinating, vitality having been destroyed, perhaps before sowing, or afterwards by some accident; but these will, indeed, be few, if care be taken in procuring genuine seed, sowing it in favorable weather, and not at two great a depth; if these blanks are filled up by transplanting, little loss will be sustained. Starting to seed is the greatest evil attending its cultivation, which, however, may be greatly checked by taking the precaution described in thinning. Any plant that may afterwards start should have the seed stalk within broken, or cut off, and this operation repeated, if necessary. By this means, those plants which would otherwise be worthless, may be made to produce tolerable bulbs.

Most economical mode of Consumption.—On all farms where the mangold wurzel is grown, there is a sufficiency of Swedes and other turnips raised for food for the cattle during the early part of winter, mangolds not being suited for early use, as they contain a peculiar acrid principle, when freshly taken out of the ground, which exercises an injurious effect on cattle, producing a very laxative state of the bowels, but which, in the course of a couple of months, either entirely disappears, or undergoes such a change as renders their use harmless; and cattle are thus found to thrive better on them when kept over till towards spring.

The best way, therefore, is to consume the Aberdeen and other soft turnips first, then the Swedes, which should at least hold out till January or February, when the mangold will be ready for use. The change from the turnips to mangold should be gradual, whether the animals be fattening, milking, or store cattle, in order to prevent the latter producing those laxative effects above alluded to. Hay or straw should be given to the cattle, between each feed of mangolds. The bulbs may be sliced or pulped, but they are frequently given whole.

Value as a Feeding Stuff.—Every animal on the farm has a great relish for mangold wurzel, and thrives remarkably well on it. They are excellent food for milch cows, producing a large flow of milk and not communicating any disagreeable flavor to it or the butter made from it. Steamed for pigs, they form, with the addition of a small portion of meal, valuable feeding. Horses also relish them, and small farmers, who cannot afford oats to their horses, may keep them in excellent

condition during the winter and spring months fed on boiled mangolds mixed with a little bran or bruised oats, in addition to hay or oat straw. About six stones of mangolds, with intermediate feeds of hay or straw, is a fair day's allowance for an ordinary sized cow.

It appears to me desirable to give the following extracts from the opinions recorded on the value of mangold as food for fattening cattle, milch cows, and other animals, by gentlemen distinguished by their practical and scientific attainments:—

"The mangold is known to be good for all animals giving milk. But it also appears, from a remarkable experiment of Lord Spencer, that this root is good for fattening also. The two beasts put up by him made even more progress when fed alternately upon mangold than upon turnips, and he considers the result to be decisive."—*Mr. Pusey* (*Journal of the Royal Agricultural Society of England*, Vol. iii. p. 201.)

"All stock like it, even horses thrive upon it; it is cheap food, and may be given to cattle in autumn if chaff is but admixed with it to counteract its laxative effect."—*Mr. Bond* (*Farmer's Magazine*.)

"This root is a very valuable food for cattle, is much relished by them, fattens well, and gives a rich milk."—*Professor Johnston* (*Highland Society's Journal*, p. 607.)

"Its use is principally as food for milch cattle, for which it is superior to all other kinds of green crop, yet its culture has not extended by any means in proportion to its value."—*Professor Murphy* (*Agricultural Instructor*, p. 52.)

"Field-beet is the best of the root class of vegetables for a cow giving milk."—*Martin Doyle.*

"My experience of the value of this root has been so long and so uniform that I have no hesitation in calling upon my brother farmers, who are similarly situated as to their climate and soil, to participate in its advantages."—*Mr. Paget* (*Journal of the Royal Agricultural Society of England*, Vol. xvii. p. 408.

"Experiments have been made to test the value of mangold wurzel compared with Swede turnips in the fattening of cattle. The experiments which have come under my knowledge—the estimate of the increase of weight of the animals experimented

upon having been made from external measurement, and not in scales—do not appear to me to be decisive, but only indicative of considerable superiority in the fattening properties of mangold wurzel over the Swedes."—*Mr. Colman* (*European Agriculture*, p. 260.)

In the interesting experiments in fattening cattle on different descriptions of food, which were carried out on Colonel M'Douall's farm in Wigtonshire, and the results of which are recorded by him in the *Journal of the Royal Agricultural Society of England*, (Vol. xiii. Part 1,) the valuable feeding properties of Mangold are clearly established, but in that climate and soil, as stated in a preceding part of this essay, a considerably larger acreable produce of Swedes can be obtained. The following note was appended by the late Mr. Pusey to Colonel M'Douall's observations on the relative merits of mangolds and Swedes. "There is no doubt that in this part of England, (Berkshire, for instance,) it is as easy to grow thirty tons of mangold as it is to grow twenty tons of Swedes to the acre. Assuming Colonel M'Douall's results to be such as would ordinarily take place, the superior profits of mangolds over Swedes is very great, for the money returns will stand as follows:—

Mangold, ...	£13	2	6	per acre.
Swedes, ...	6	5	0	"

The money return from the mangold therefore appears to be more than double that from the Swede. There is also the great advantage of the land being clear for the timely sowing of barley, by feeding stock on mangold, which, of course, has been stored, instead of keeping the sheep on Swedes run to seed in April, while the seed time for barley is passing or gone. This experiment strongly confirms those of the late Lord Spencer, which appeared some years since in this Journal. The laxative tendency of mangold is easily, as in this case counteracted by the accompaniment of bean meal."

Dr. Voelcker has recently drawn attention to the singular circumstance that although the mangold is "justly esteemed on account of its fattening properties when given to beasts, yet it appears to be about the worst description of roots that can be

given to sheep." And again he says, "On further inquiry I have learned that this observation is confirmed by many practical feeders. Mangolds, therefore, ought not to be given to sheep."*

The following table shows the quantity of milk yielded by cows fed at the Albert Farm on mangolds, as compared with that given by the same cows when fed on Swedish turnips. The turnips and mangolds were prepared in the same manner (washed and sliced,) and in both instances the cattle were out for water and exercise an hour daily; and their treatment in every other respect was precisely similar:—

	Cows milked.	Food consumed by each cow daily.	Milk yielded.	Total.	Increase.	Daily Increase.
1858.			gals.	gals.	gals.	ls.
Feb. 15,	23	$6\frac{1}{2}$ st. Swedish Turnips, Oat Straw, *ad libitum*, . .	$28\frac{1}{2}$			
" 16,	23	$6\frac{1}{2}$ st. Swedish Turnips, Oat Straw, *ad libitum*, . .	29	$57\frac{1}{2}$		
" 26,	23	$6\frac{1}{2}$ st. Mangolds, Oat Straw, *ad libitum*, . . .	31			
" 27,	23	$6\frac{1}{2}$ st. Mangolds, Oat Straw, *ad libitum*, . . .	32	63		
					$5\frac{1}{2}$	$2\frac{3}{4}$

The change of food from Swedes to mangold took place on the 17th, and with the view of preventing the secretion of milk, either as regards quantity or quality, being influenced by the former mode of feeding, the second experiment was not made until the 26th. As fully three-fourths of the cows were heavy in calf, and the quantity of milk yielded by them naturally on the decrease, the period which elapsed between the trials on the 15th and 16th and those on the 26th and 27th would, to some extent, lessen the result in favor of the mangolds.

The annexed table gives the results of an experiment recently made at the Albert Farm, by churning some of the whole milk† yielded by the cows when fed on mangolds and oat straw:—

* "On the Chemistry of Food." p. 30.

† The Lactometer indicated 11 per cent. of cream.

Milk churned.	Butter made.		Cream yielded.	Cream to 1 lb. Butter.	Milk to 1 qt. Cream.	Butter from 1 qt. Cream.	Milk to 1 lb. Butter.
quarts.	lbs.	ozs.	quarts.	quarts.	quarts.	ozs.	quarts.
40	4	$1\frac{1}{2}$	$4\frac{2}{5}$	$1\frac{1}{15}$	$9\frac{1}{11}$	15	10 (nearly.)

Compositon of Mangold Wurzel.—Dr. Voelcker, in his very valuable and recently published work, "The Chemistry of Food," (p. 28,) says: "Mangolds have been analyzed by Professors Way, Johnston, Wolff, and myself; but as it will be of no practical utility to mention these various analyses in detail, I shall leave them unnoticed, and state at once the average composition of good mangold wurzel, which has been calculated from thirteen published analyses of this root:—

	In Natural State.	Caculated Dry.
Water, ...	87.78	–
Flesh-forming Constituents, ...	1.54	12.60
Woody Fibre, ...	1.12	9.16
Sugar, ...	6.10	49.91
Pectin, Gum, &c., ...	2.50	20.45
Inorganic matters, (ash,)	0.96	7.88
	100.00	100.00

"Mangolds, it will be observed, contain on an average as much water and dry matters as carrots, and on the whole, are almost as nutritious as carrots, if they are given to fattening beasts after a few months' keeping. . . . . The superior fattening value of stored mangolds, when compared with the fresh root, may be due to the absence of this acrid principle in old roots, but doubtless it must be attributed also to the larger amount of sugar which stored mangolds contain. An examination of fresh and old mangolds, has shown me that, on keeping, the pectin in the fresh roots is gradually formed into sugar,

which appears to be more conducive to the rapid fattening of beasts than pectin. For these reasons mangold wurzel ought not to be supplied to animals before the latter end of December or the beginning of January."

According to the analyses of Professor Way, and Mr. Ogston, of long red and yellow globe, mangolds gave the following results (in 100 parts):—

	Long Red.		Yellow Globe.	
	Bulb.	Leaf.	Bulb.	Leaf.
Potash,	29.08	27.53	23.54	8.34
Soda,	19.05	5.83	19.08	12.21
Lime,	2.17	9.06	1.78	8.72
Magnesia,	2.79	3.10	1.75	9.84
Peroxide of Iron,	0.56	0.48	0.74	1.46
Silicia,	4.11	1.35	2.22	2.35
Sulphuric Acid,	3.31	6.26	3.68	6.54
Phosphoric Acid,	3.11	4.39	4.49	5.89
Carbonic Acid,	21.61	6.11	18.14	6.92
Chloride of Sodium, (common Salt,)	14.18	29.85	24.54	37.66
Total,	99.94	99.96	99.96	99.95
Percentage of Ash,	1.60	1.91	1.02	1.40

It may be observed by an inspection of the foregoing table, that the tops or leaves are richer in phosphoric acid, lime, and magnesia, than the bulbs, but contain less of the alkaline carbonates, i. e., carbonates of potash, soda, &c. It will also be seen that both tops and bulbs contain a large percentage of common salt, which accounts for the beneficial results arising from its application to the crop.

Professor Johnston says: "the dry matter of the mangold wurzel and the carrot resembles in composition that of the turnip. Some varieties of these roots contain still more sugar. They likewise surpass the turnip in their percentage of dry nutritive matter. This in the three roots, is nearly as follows:—

	Turnip.	Mangold.	Carrot.
Dry nutritive matter,	8 to 12	15	14 to 20
Water,	92 to 88	85	86 to 80
	100	100	100

Hence the generally more nutritive quality of the two latter roots, weight for weight.—*Elements of Agricultural Chemistry*, p. 326.

ESSEX.

Statement of Robert A. Smith.

SUGAR BEETS.—I herewith submit a statement of a crop of sugar beets raised on one-half acre of land. The land on which they were raised is a clay loam, and has been in cultivation five years, and manured at the rate of about five cords per acre, yearly. Last year it was planted with corn, and yielded about fifty bushels per acre. After the corn was taken off, a part of the piece was manured with coarse horse manure at the rate of eight cords per acre, the remaining part with manure from the barn cellar in which hogs had been kept; it was composed of about equal parts of horse and cow manure and sand, and applied at the rate of seven cords per acre, the whole spread on and ploughed in. In December, fine gravel was put on at the rate of two hundred loads per acre. On the 21st of May it was harrowed and the rows marked off two feet apart; the seed was put in by hand nine inches apart, which I think is much better than sowing with a machine, as it saves thinning out, and enables me to do most of the weeding with the hoe. The crop was taken off last week, and yielded four hundred and sixty bushels, and weighed 22,585 pounds. The part of the bed that was manured from the barn cellar yielded about one-third more than the part where the horse manure was applied.

NEWBURYPORT, November 13, 1858.

Statement of Aaron Low.

RUTA-BAGAS.—I enter for the society's premium one-half acre of ruta-baga turnips. The land on which these were raised is a sandy loam, and has been cultivated two years. In 1856 it was planted with corn, and was manured with one shovelful of barn manure to each hill, and produced a fair crop. In 1857 it was planted with squashes and corn, and was manured with two shovelfuls of manure to each hill of the squashes and one to each hill of the corn, and produced a very good crop. In the latter part of last May I hauled on three cords of barn

manure, and spread and ploughed it in. On the 1st of June I harrowed and furrowed it. The turnips were sown on the 7th of June, in rows three feet apart, first having a small portion of guano scattered in the rows and covered an inch deep; as they did not come up well, I resowed them on the 30th day of June. From the second sowing the seed came up on most of the piece very well, although in some of the rows they were not quite thick enough. They were hoed twice, and the last time they were thinned out, standing from eight to ten inches apart in the rows.

The crop was taken off this week, and yielded 335 bushels of very smooth and handsome turnips. The following is the cost of raising the crop, which is a fraction over 8 cents a bushel:—

To 3 cords manure at $4 per cord, half expended, .	$6 00
Ploughing, harrowing and furrowing, ...	3 00
To 165 lbs. guano, ...	4 95
Planting, ...	3 00
To 1½ lbs. seed, ...	1 15
To hoeing twice, ...	5 00
To gathering, ...	5 00
	$28 10

Essex, November 11, 1858.

Statement of Samuel A. Merrill.

Cabbages.—The method adopted by me in preparing the soil, and managing a piece of cabbages containing one acre, with the number and weight of heads raised on the same, is as follows:—

I took a piece of mowing, (which cut about one and a quarter tons of hay per acre,) and ploughed it in November of last fall. I then spread about three cords of green manure from barn cellar for top-dressing; gave it a faithful harrowing, furrowed three feet apart and dressed with compost manure—about four cords put in hills about three feet and a half apart. I planted it about the 10th of April, thinned about the first of May, at the time of the first hoeing; cultivated and hoed three times during the season; it took about four days' work at each hoeing at $1 per day for season hands; cost of cultivating, $4; the manure used was worth about $6 per cord; the cost of fitting the ground

30

and planting it was about $12 ; cost of marketing, as near as I can judge, about $20 per thousand.

I raised on this piece 3,500 cabbages suitable for the market, averaging from 35 to 40 pounds as they grew, (with leaves and stump, and free from dirt;) when trimmed for the table they averaged from 25 to 30 pounds per head. I commenced marketing them the first of September, averaging from $8 to $10 per hundred; I sold some as high as $12 per hundred. It took about four ounces of the white drumhead seed.

SALEM, October 20, 1858.

WORCESTER NORTH.

Statement of John Brooks, Jr.

POTATOES.—The lot on which my experiment potatoes grew, I supposed to have contained one acre, but it was found by measurement to contain only 139 rods. The soil is light and gravelly. The crop of 1856–7 was grass without manure. It was ploughed May 25th, with a double plough, about eight inches deep, harrowed and furrowed. The cost of ploughing and other preparations was six dollars. I manured with fifteen loads of horse manure, spread before ploughing, and 300 pounds guano mixed with one load of muck, one handful in each hill; value of manure, $15, guano, $9, total $24. It was planted June 8th, 9th and 10th, in hills two and a half by three and a half feet apart. Seed twelve bushels St. Helena potatoes, worth $600; the cost of planting being $4.50. They were hoed twice at a cost of $8, and harvested October 2d and 4th, yielding 71⅛ pounds per square rod. The potatoes raised are very nice ones, and do not rot in the least. I have sold four barrels for $1 per bushel, and have an order for from two to ten barrels more.

Statement of Abel Marshall.

POTATOES.—The acre upon which my crop of potatoes for experiment was raised, is a variable soil; part of it a light yellow loam, with a loose subsoil, and part of it a heavy, dark loam, with a clayey bottom. It has been in grass, without manure, for twenty years previous to the present. It was

ploughed April 19th, with a double Michigan plough, about ten inches deep; harrowed once lengthways of the furrows, and furrowed one way. The rows three feet four inches apart and the hills two feet apart; the cost of ploughing and other preparations, was $6. It was manured with 14 loads of green stable manure, spread before harrowing, and six loads loam from under an old leanto, put in the hill; value of manure upon the land, $17; it was planted April 24th and 29th, in ten lots, the first nine of which contained five rows each, nine rods in length.

No. 1, two whole potatoes size of a hen's egg, per hill.
No. 2, one whole potato, good size to cook, per hill.
No. 3, two halves of large potatoes, per hill.
No. 4, two small potatoes, per hill, to be thinned.
No. 5, one whole potato, per hill, to be thinned.
No. 6, two halves, per hill, to be thinned.
No. 7, three pieces, one eye each, per hill.
No. 8, two pieces root end, per hill.
No. 9, two pieces seed end, per hill.

All the above were improved peach blows.

No. 10 embraced the remainder of the field, and was planted, partly with early white and partly with small peach blow potatoes, the yield of which was not very satisfactory.

Seed, ten bushels, worth $7; cost of planting, $2.50; harrowed between rows twice; hoed once; ploughed with a double mould-board plough once; cost of cultivation $2.50; harvested November first to tenth.

No. 1, produced 8½ bushels, medium size.
No. 2, produced 9½ bushels, large size.
No. 3, produced 11 bushels, extra large size.
No. 4, produced 10½ bushels, rather small size.
No. 5, produced 8½ bushels, medium size.
No. 6, produced 8½ bushels, medium size.
No. 7, produced 5½ bushels, small size.
No. 8, produced 8⅝ bushels, extra large size.
No. 9, produced 8⅛ bushels, large size.

FARM IMPLEMENTS.

MASSACHUSETTS.

Statement of George W. Lyman.

I have the pleasure to report to you about the working of the Tedding Machine imported by the trustees of the Massachusetts Society for Promoting Agriculture.

The machine has been used with great advantage, and has given satisfaction to the haymakers. No part of it has broken, or yielded to the hard work done by it. It has been applied to the swaths laid by the mowing machine when they were dry enough to be turned and in the direction of the mower. If grass is cut by the scythe it works best by being driven across the swaths.

The machine has two motions, communicated by gears in the hubs of the wheels—one forward, which lifts the grass and throws it above, over, and behind the machine; the other motion is a reverse one, lifting the grass and throwing it behind. Both motions lift, open and spread the grass, more perfectly than can be done by a man and fork, and the machine does its work as fast as a horse carries it forward. It is heavy, does much work very quickly, and requires one good horse to draw it. I have been away from my farm much of the time of haymaking, but I may safely say that the men who have used it commend it highly as a labor-saving machine, doing its work without any delay.

The machine weighs 1,090 pounds. Wheels, axle and frame-work, are iron.

WALTHAM, September 1, 1858.

ESSEX.

From the Report of the Committee.

Next in importance to the power that guides, are the implements to be used in the labor of the farm. So many have been the improvements in labor-saving machines, that he that works without the use of these improvements, works to great disadvantage. In no branch of the labor of the farm, is this more apparent than in cutting and curing the grass of the fields. It

is safe to estimate, that one-half of the labor may be saved, in the cutting, spreading, and raking of hay, by the use of machinery best fitted for this purpose, moved by horse-power.

To encourage the introduction of such machines, the trustees have for several years offered liberal premiums, from the fund created for this purpose by the discriminating generosity of the president of the society. And when it was fully expended, so strongly were they impressed with the importance of these offers, that to a certain extent they kept the door open for further experiments. Fully impressed with the trust committed to our charge, we have spared no pains in calling attention to the subject; and on several occasions, the present season, have witnessed highly interesting experiments; the premiums having been offered for *experiments only*—statements in writing of which to be furnished to the committee. Of these, we have been favored only with three, all of which are appended to this report, and will be examined with an interest proportioned to their minuteness of detail.

J. W. Proctor, *Chairman.*

Statement of Samuel A. Merrill.

Allen's Mower.—I present for the premium offered by your society, *Allen's Mower with latest improvements*, the same that I have used the past season on my own and my neighbors' lands. I have used it with a span of horses that I have owned for several years, weighing about 1,000 pounds each.

During the past hay season I have cut about 300 acres; all but 75 acres of which were cut with this machine, the remainder with the old Allen machine. I have used the same horses throughout the season, and they remained in as good condition as when they commenced. I have averaged when at work from ten to twelve acres per day, and this without over-working the team. The average yield of the grass was about a ton and a half to the acre.

Although my average time to the acre has been about fifty minutes, yet I have several times cut an acre yielding a ton, in thirty minutes.

I had to grind the knives once a day, occupying about half an hour, and sharpen them with a whet-stone occasionally, as they needed it.

The trouble of keeping it in repair was very slight indeed. No repairs were made upon it during the whole season but by myself, and only in a single instance when one of the knives was broken. I supplied a new knife at a cost of seventeen cents. No other repairs were made or were necessary, owing to the perfection and simplicity of the machine.

I cut with it about forty acres of second crop and found that it worked it as well as in first crop.

I do not mean to say that I have done all of this work myself personally. About one-half of it was done by a young man in my employ; and although he commenced this season without any previous practice, he was, after a week's experience, enabled to work the machine as well as I could. The difficulty with a new beginner is more in the management of the team than of the machine.

I have given a fair trial to all the mowing machines that I have seen except the Danforth Improved; though I have never used this one I have worked with mine by the side of it and had a good opportunity to observe its operations, and am clearly of opinion that the Allen machine is much superior to it in every practical point.

I have found that one of the greatest advantages of the Allen machine is in the fact that the knives are all well guarded so as to almost wholly protect them from injury by stones. Another great advantage is that the knives can be easily raised by means of a lever and wheel (without stopping the team) so as to pass safely over rocks and stumps eighteen inches high. This feature of the machine renders it quite advantageous in rough, stony or stumpy fields.

I have used, besides the Allen machine, the Heath, Russell, Manny, and the Ketchum machines, and have found none but the Allen to work satisfactorily.

Salem, November 11, 1858.

Statement of James Cary.

Manny's Mower.—The machine which I offer and have operated for the premium the present season, is Manny's Improved, with which I have cut upwards of eighty acres of grass. The average time of cutting per acre is fifty minutes.

With regard to accidents I have been very fortunate, having broken but one section of the knives in the season. I have been very much surprised at its little liability to get out of repair or so dull as to need grinding, having cut sixty acres with once grinding the knives.

The great improvement in this machine over the old one, consists in its castor wheel, which takes all weight off the horses' necks, when it is broke up to move from place to place. It is also so constructed that if it is considered necessary in cutting lodged grass, the back can be removed in a few minutes, and leave the bare knife-bar like most of the other machines in use. In that case we must dispense with the use of the reel, which I consider almost indispensable in going with the wind of a windy day; otherwise the driver must carry a long stick to poke the grass back as it is cut.

Another improvement is in the quicker motion of the knives, enabling it to start in the grass without fail, as certainly as some other machines did fail to start in grass, as your chairman saw at the first trial of mowing machines at the Pickman farm in South Salem, and I regret very much that the committee were not then present to view that operation, and see the ease with which one of my horses on the two-horse mower cut a quarter of an acre of grass, and also whether it was as the spectators said, the best cut piece of grass on the field.

Swampscott, Nov. 10, 1858.

Statement of George B. Loring.

Danforth's Mower.—I take the earliest opportunity which an unusual pressure of duties would allow, to make a statement to the committee on agricultural implements, of the Essex Agricultural Society. I enter two machines for premium, viz.: Danforth's Mowing Machine, constructed by J. W. Thompson of Greenfield, Mass., and a tedder, purchased in England by R. S. Fay, for the Massachusetts Society for Promotion of Agriculture.

Of the mowing machine, I would say that it comes very near the fulfilment of my ideas of what such an instrument should be. I conceive that agricultural machinery should be simple, light, easily managed, and strong. These qualities should be

possessed particularly by a mowing machine, the use of which comes at a season when the accumulation of business on a farm requires great rapidity of execution, and when it is impossible to be very fastidious in our selection of labor. Such a machine should be capable of doing its work on smooth land and rough, with or without an expert driver or machinist, with good horses and bad ones, in light grass and heavy, and without the exercise of great skill on the part of the driver, or the outlay of great strength or speed by the team. In this way alone can it be made really an economical and profitable appendage to a farm. Our lands are not lawns, and we cannot afford to make them so. It is impossible for us to hire skilful men, at a price within the limits of a farmer's means. Every farmer cannot expect to be able to devote himself throughout the haying season to a mowing machine. Neither can he afford to purchase a pair of horses well broken to this work alone.

I do not mean to say that the Danforth machine is perfect. But I can say that I have seen it work on my farm under circumstances which would have foiled any other machine I have ever seen used. My driver had never used a machine of the kind until I set him at work with this one. My horses are young and inexperienced. My grass was heavy, matted at the bottom and much of it lodged. My land is very rough. And yet the machine which I enter for premium performed its work perfectly well amidst all these obstacles. In draft it is very light and easy—never having worried my horses at all. It never clogs unless the knives are plunged into sods and roots, and even then, but seldom. It requires no clearing board, and cuts equally well in fallen and standing grass. It leaves the field smooth and without any "mane" between the swaths. It is easily managed, is conveniently sharpened, and can be driven against obstacles almost with impunity. I have used it in cutting my second crop, and found it as serviceable as in the first.

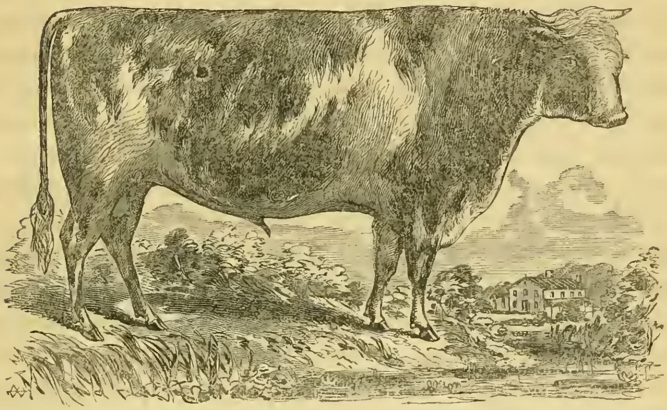
A one-horse machine of the same invention has been used by me, and may be considered almost invaluable on a small farm.

The tedder I have used very extensively in spreading my hay. It is an English machine, strong, and rather heavy in its construction—but beautifully adapted to the work for which it

is designed. I have used it mostly with two horses. And I find that with this team and a driver, it will spread an acre of mown grass, much more thoroughly than the most expert man could do it, in less than ten minutes.

I trust so valuable a machine will soon be brought within the reach of all our farmers.

SALEM, November 5, 1858.



Ayrshire Bull, "ALBERT," imported by the Massachusetts Society for Promoting Agriculture.

NEAT STOCK.

Description and Pedigree of Ayrshire Cattle, purchased in Scotland and Imported by the Massachusetts Society for Promoting Agriculture, 1858.

Bull, No. 1, "Albert," brownish red and white, two years old, purchased of John Steele, near Ochiltree, bred by James Hendrie of Drumdrock, sire, Jock, bred by Mr. Bowie, of Riccarton, winner of the first prize at Killock cattle show, 1855. Grandsire, Geordie, bred by Mr. Hendrie, winner of the second prize as a two-year-old, at Galston, 1849, and the second as a three-year-old, 1850. Dam, Kirstie, by Geordie (before mentioned), grandam, Nancy, (never shown,) by Hilburnie, the winner of the first prize as a two-year-old, at Galston, 1845; also, the first at Grongar, 1846.

Albert won the second prize as a yearling, at the show of the Agricultural Association, 1857; also, the first prize at Ochiltree same year, and the second prize at the same place as a two-year-old, 1858. Mr. Howard says: "With the exception of Mr. Parker's bull, which took the prize over him at Ayr, he is the best of the breed, of his age, that I saw in Scotland."

No. 2. "Troon," brownish red, with a few small white spots, two years old, purchased of Andrew Aiton, Esq., of Craigend, near Troon, bred by Mr. Kirkwood, of Highland Muir. Sire, bred by John Parker, of Nether Broomlands. Irvine, dam, considered one of the best in Mr. Kirkwood's herd.

No. 3. "Tam Sampson," brownish red and white, white predominating, one year old, purchased of John Mickle, bred by Andrew Aiton, who says: "He was got by a bull that was from a cow which gained the first prize at the county (Ayr) show; his dam, a cow bred by myself, whose grandam gained several prizes. I consider him as well bred as any bull in the county."

No. 4. "Irvine," color red. Calved May, 1858, purchased of and bred by Mr. John Parker, of Nether Broomlands. Sire, bred by Mr. Parker, winner of several prizes and of the noted family possessed by him for nearly thirty years. Dam, bred by Mr Parker, winner of the first prize at the county show; she is also dam of the cow which took the first prize in 1858. Mr. Parker says: "The dam of the bull calf gained the medal at the Ayr county show when two years old, and when in milk gained many prizes at Ayr and other shows. The dam of his sire has also gained many first prizes."

Heifer, No. 1. "Miss Aiton," light red, flecked with white, three years old, purchased of and bred by Andrew Aiton. Sire, dam and grandam bred by Mr. Aiton, bulled by Troon, July 16th.

No. 2. "Mavis," brownish red and white, spotted, two years old, purchased of Mr. Aiton, bred by John Dunlop, near Stewarton, whose breed is reputed to be of very fine quality, bulled by Troon, July 9th.

No. 3. "Lilly," brownish red and white, white predominating, one year old, purchased of and bred by John Parker, sire and dam bred by him. The latter is also dam of the celebrated

bull, "Cardigan," who has taken twenty-four first prizes. Lilly is a twin, and a late calf last year.

No. 4. "Panzy," brownish red, with a few patches of white, one year old, purchased of and bred by John Parker. Sire, bred by Mr. Parker, and got by Cardigan's sire. Dam, bred by Mr. Parker, and "winner of many prizes."

No. 5. "Daisy," brownish red and white, one year old, purchased of and bred by David Wilson, of Irvine. She is seven-eighths of the blood of Mr. Parker's herd.

No. 6. "Harriet," light red and white, two years old, purchased of John Mickle, of Brownhill, near Tarbolton; bred by Mr. Campbell, of woodside, Monckton, and said to be out of the best cow of his herd. In calf by a son of Cardigan.

No. 7. "Ruth," light brown, one year old, purchased of James Mickle, of Claxton, near Tarbolton, bred by Mr. Campbell, of Dalgig. Sire, Cardigan. Dam, a fine cow owned by Mr. Campbell.

No. 8. "Miss Markland," light red, two years old, purchased of and bred by James Reid of Torcross, near Tarbolton. Sire, bred by Mr. Reid, grandsire, won the first prize at the Ayrshire show, as the best aged bull. Dam, bred by Mr. Reid, a superior cow, grandam also bred by him, and a winner of several first prizes; bulled by Mr. Reid's Sir Colin, July 7th.

No. 9. "Miss Smith," red, two years old, purchased of and bred by George Richmond, near Dalrymple. Sire, Geordie, who was by Kilmaurs, whose dam won several prizes. Dam, sister to Young Crammy, winner of several prizes.

No. 10. "Rosa," light red and white, two years old, purchased of and bred by Hugh Lambie, near Tarbolton. Sire, Alexander. Dam, Jean, both bred by him from Ayrshire stock kept by him for twenty years.

No. 11. "Miss Anderson," brownish red and white, white predominating, two years old, purchased of James Anderson, of Kirkhill, near Ayr, bred by Alexander Bruce, of Shawe, out of one of his best cows, and reputed first rate stock on both sides.

ESSEX.

From the Report of the Committee on Bulls of Foreign Breed.

Of the Ayrshire breed we are sorry to say that the exhibition, as regards numbers, was very meagre indeed, there being but one bull of the above species on the ground, but justice compels us to state that the one exhibited was a "host in himself." This bull was offered for premium by George B. Loring of Salem, and the committee are unanimous in saying that he is one of the finest animals of the class it has ever been their good fortune to look upon; and after a careful examination of all his points, they are fully satisfied in awarding to Dr. Loring the first premium.*

JAMES STEVENS, *Chairman.*

From the Report of the Committee on Milch Cows of Native or Mixed Breed.

The committee add the following statements and details. William Mack's statement:—

"I present for premium my red cow 'Daisy,' seven years old last spring. She is a native mixed with Hereford. She dropped her last calf March 29th, and will calve again about the middle of next April. From the time she dropped her calf till the middle of May, she had two quarts of shorts per day, with English hay, first crop. From the middle of May to the 20th of August, she had nothing but fair pasturing. From August 20th to the present time, she had corn fodder, in addition to her pasturing. Below is a table showing the quantity of milk she has given from April 20th to the present time. The milk has been measured by beer measure, and weighed by avoirdupois weight. The milk has been weighed twice each month, and has averaged two pounds and eleven ounces per beer quart.

"By the lactometer, the largest quantity of cream indicated has been $\frac{17}{100}$, and the smallest has been $\frac{14}{100}$.

"The average of her milk per day from April 20th (when the calf was taken away) to September 25th, as will appear by the

* See Frontispiece.

table, has been $13\frac{61}{158}$ quarts. The calf was sold to the butcher for $6."

Then follows an exact daily table of the milk from April 20th to September 26th. Result as follows :—

From April 20 to May 1, . .	161 quarts,	432 lbs.	8 oz.
May 1 to June 1, . . .	485 "	1,310 "	15 "
June 1 to July 1, . .	451 "	1,211 "	9 "
July 1 to August 1, . .	$388\frac{1}{2}$ "	1,046 "	8 "
August 1 to September 1, .	355 "	953 "	$11\frac{1}{2}$ "
September 1 September 26, .	$274\frac{1}{2}$ "	737 "	5 "
Total, . .	2,115 q'ts.,	5,692 lbs.	$8\frac{1}{2}$oz

From June 1 to June 11, 157 quarts, 421 lbs. 12 oz.
Sept. 1 to Sept. 11, $111\frac{1}{2}$ " 299 " 8 "

The following is the statement of Albert Dodge of Beverly, to whom was awarded the second premium :—

"I enter for premium one black cow, ten years old, a cross between the Alderney and Durham. She dropped her calf on the 15th of August, 1857 ; the calf was taken away the 1st of September. The amount of milk given in

	Quarts.		Quarts.
September, . .	525	April, . . .	375
October, . . .	512	May, ...	340
November, . .	500	June, . . .	360
December, . .	475	July, ...	280
January, 1858, . .	465	August, . . .	235
February, . . .	420		
March, . . .	400		4,887

"Through the winter she had cut hay with about four quarts of shorts per day ; in summer nothing but grass, in common pasture."

The statement of Isaac Dempsey of Danvers Centre, to whom was awarded the third premium, is as follows :—

"The cow I offer for premium is eight years old. I have owned her for five years ; her breed is native. She had her last calf last April and is to calve again next May. Her

keeping has been pasture feed with two quarts of meal per day. Her milk was weighed morning and evening for the first ten days in June and September, with the following result:"—

	Pounds.			Pounds.	
	Morning.	Evening.		Morning.	Evening.
June 1, . .	16 1/1	22¾	Sept. 1, . .	14½	17¾
2, . .	18¾	23¾	2, . .	12½	18½
3, . .	17	24½	3, . .	12	18¾
4, . .	17	26¾	4, . .	13¼	13¼
5, . .	18¾	23¼	5, . .	16¼	12½
6, . .	18¼	24¼	6, . .	16¾	17½
7, . .	16¼	23	7, . .	17	19
8, . .	17¼	22	8, . .	14	16¼
9, . .	15¾	25½	9, . .	15½	16½
10, . .	20	26	10, . .	13	18
	175¼.	241½		144¾	168
		175¼			144¾
Total in ten days, .		416¾	Total for 10 days, .		312¾

Besides those to whom premiums were awarded there were some other cows offered, and among them was a cow belonging to Israel P. Boardman of Danvers, that possessed good qualities and points; another belonging to Adam Nesmith, also of Danvers, of Jersey grade, which showed indications of being a good milker, but was in poor condition, so much so, as might induce any one to withhold a premium. The committee would especially mention a remarkable cow, when her age is considered, belonging to James Stevens of Andover, offered for exhibition only. We give in his own words the following statement.

"I offer for exhibition my cow 'Matron.' She is fifteen years old, and was raised by myself from a native cow, and sired by a Durham bull from the Silsbee farm in Bradford. She has always been a great milker, but as I have never kept an account of her produce until this season, I have never before offered her for exhibition.

"On the 3d of January, 1858, she dropped her calf, and on the following 6th, having in the meantime disposed of the calf,

I commenced keeping a true and accurate account of her milk, and the amount of sales, and ended on the 6th of September, making just eight months.

"She began by giving sixteen quarts a day, and three days in succession in January she gave seventeen quarts each day, but sixteen quarts a day was her average through the month. She gave sixteen quarts a day until the 20th of February, and then fifteen for the remainder of the month. In March, she gave fifteen quarts a day nearly all the month.

From January 6th to February 6th, she gave	400	quarts.
February 1st to March 1st, she gave	432	"
March 1st to April 1st, she gave	434	"
Total for the three months,	1,266	"

"This was sold at the barn for four cents per quart, making the amount $50.64. During the three above mentioned months, her feed was as much good English hay as she could eat, and twelve quarts of fine feed, (or six quarts of cob meal and four quarts of fine feed) each day. Her drink was twelve pails of warm water each day. She drank five pails of water in the morning, two at noon, and five at night. The fine feed (or meal) was mixed with her drink. This statement may seem large, but I can substantiate it by many witnesses.

"On the first of April the price of milk was reduced from four cents per quart to twenty-five cents for nine quarts.

From April 1st to May 1st, she gave	360	quarts.
May 1st to June 1st, she gave	310	"
June 1st to July 1st, she gave	300	"
July 1st to August 1st, she gave	297	"
August 1st to September 1st, she gave	248	"
September 1st to September 6th, she gave	42	"
Total for five months and six days,	1,557	
From January 6th to April 1st, she gave	1,266	
Sum total for eight months,	2,823	

"After she left the barn, and went to pasture, she had good feed of grass with no grain. Since August she has been fed night and morning with fodder corn. From April 1st to May 20th, (when she went to pasture,) her drink was cold water (with the amount of grain mentioned above,) which I think accounts for the decrease in her milk in April. She will calve on the first of January next. The amount received for her milk for eight months is $95.16."

In closing this report the committee feel called upon to urge all persons who may offer animals for exhibition or premium (more particularly the latter) to render an accurate and detailed statement, and not to have cows, bulls and swine included in one and the same statement, (which occurred in more instances than one,) for it must be obvious, were they all so mixed up the committee on each *class* would not receive it, nor could they know that such a statement was in the hands of another committee.

In the confusion attendant upon such occasions, mistakes may easily occur—and from the above cause persons exhibiting valuable animals may be disappointed in their statements not reaching the appropriate committee.

The committee instead of gratuitously offering any advice, or opinions of their own, in relation to dairy stock, would earnestly recommend to the perusal of all farmers, a very valuable work recently issued from the press by Charles L. Flint, Secretary of the Massachusetts State Board of Agriculture, entitled "Milch Cows and Dairy Farming." They will find the work filled with details of the most interesting and valuable facts and suggestions.

RICHARD S. ROGERS, *Chairman.*

MIDDLESEX.

From the Report of the Committee on Heifers and Heifer Calves.

It was highly gratifying to the committee to see so many fine heifer calves in the pens. It is an indication that our farmers have set about raising their own cows, and we have no doubt that by care and perseverance, our stock of milch cows will be greatly improved. To effect this object, we must begin with the calves. Those only should be reared, which have come

from good milkers. The mother should be a good milker, and the bull should come from a good milker, and then we shall have a good chance to have a good milker. Sometimes one parent imparts its character to the progeny, and sometimes the other. If both possess the property desired, our probability of securing it in the offspring is greatly increased; and the longer the line of descent through which any characteristic can be traced, the stronger is the probability that it will be found in the animal we are rearing. To insure good milking properties, or any other properties, it is not sufficient that they should have been possessed by the immediate parent. This may be accidental. They should be established as the permanent properties of the family or breed to which they belong. So long as our farmers purchase from droves, heifers or young cows, on which they depend for milkers, they cannot be sure that the progeny of those even that prove good milkers, will inherit the same character. But a calf that has sprung from several successive generations of good milkers, may be relied upon with a good degree of certainty.

Good milkers possess certain physical marks or characteristics, which, although not absolutely certain indications, should never be neglected. These marks are well known to all observing men, and may be seen in the calf, at least the most prominent of them, at an early period.

We think no farmer, wishing to obtain a good milker, would raise a calf with a large head and a short muzzle, large, thick neck, full, high shoulders, large legs, short, thick tail and coarse hair. He would rather select one with a small head, long muzzle, bright eyes, thin, tapering neck, small legs, large hind quarters, long, slim tail, soft skin and fine hair. Guenon and Haxton affirm that the form and size of the escutcheon, upon which they greatly rely in determining the character of the cow, may be ascertained in the calf; that it is not fully developed, because the parts on which it is placed are not fully developed at this period of life; but that careful examination will reveal its true character. Now, although there are apparent exceptions to Guenon's rules, yet we believe that most good milkers possess the marks which he points out. If these marks can be ascertained in the calf, they will afford a guide of no small value in determining what heifer calves to raise, and what to send to the

butcher. This whole subject deserves more attention than it has hitherto received. The next thing to be attended to, is the treatment which calves and heifers should receive before they give milk. When taken from the cow, they should be provided with food suited to their condition and health. They should be taught to eat a variety of food, and should have a good supply of pure water. Calves want a large quantity of drink, and it is desirable that they should get the habit of drinking freely, as this is essential to free milkers. They should be treated with the utmost kindness and gentleness, and never teased, or beaten, or frightened, but should be taught to feed from the hand, and to have entire confidence in those who take care of them. Rowen hay, or fine redtop, with a few turnips, or oats, or beans, is the best food for the first winter. They should be well protected from the cold and storms, and not permitted to roam about the fields, shivering in the rain and snow. They should be kept clean and dry, and not suffered to become lousy, but should receive the same care from the first that is bestowed upon cows in milk. In this way only can they be kept in a thriving, healthy condition, and become well developed in all their parts. A calf that is suffering from cold, from vermin, from fear, from want of food, or drink, cannot thrive or be in good health; its growth will be checked, and it will never be as valuable afterwards. A young animal is more tender and more susceptible of injury than one that is fully grown and has reached its full strength; and yet many persons will expose a calf to treatment that they would not allow to a cow, or an ox, and the result is what might be reasonably expected. Young animals should be treated with the utmost care and tenderness, and thus they will be kept in a growing state, and be early developed, and fitted for the use for which they are intended.

Statement of N. H. Warren.

Gentlemen,—The Ayrshire cow which I offer for premium, was bred from Prince Albert and Jenny Dean's full blood Ayrshire stock, imported by the Massachusetts Agricultural Society, and presented to the Middlesex Society, of whose agent I purchased this cow when a calf.

She has always brought calves in the fall or early winter, and been kept tied up in the barn in the summer and milked until

near calving. She was dried early in September, and dropped her calf the last of October, 1857, having run dry some weeks longer than usual. She gave in November, December and January last, fifteen and one-half quarts of milk per day, when she gradually decreased to ten quarts in May, which quantity she has very nearly kept up, as she gives something more than eight quarts per day at this time.

Her feed in winter is English hay, husks and stalks, and her share of the weather-caught and poor hay that grows on the farm, as she ties up with and fares as the rest do. In summer she stands in the barn and is fed on grass, corn fodder and hay. In winter and while fed on hay in the summer, she has from one to three pints of meal per day.

I am aware that the quantity which she gives when new milch, seems small for an extra cow, but when you consider that when within two months of calving she gives as much as an ordinary new milch cow, and that her keeping is not calculated to force her milking capacities at all, I think it will be conceded that her average during the year, something over nine quarts per day, is fully up to the average of extra cows. She has been turned out a part of the forenoon for the last month. She was eight years old the 30th of last March, and is to calve on the 2d of January next. I sell her milk, and know nothing of her qualities as a butter cow.

CONCORD, September 29, 1858.

WORCESTER.

Report of the Committee on Dairies.

The Committee on dairies have the honor to report that they have attended to their duties, and have carefully examined the statements of Messrs. Samuel Ellsworth and William Robinson, Jr., of Barre, the only two competitors for the society's premiums. They have also examined, in the society's pens, a representation of the cows of each gentleman's dairy, and samples of their butter and cheese in the exhibition hall below. Mr. Ellsworth's dairy consists of eleven cows, of various ages, ranging from three to eleven years, all of which are grades of the Durham breed; nine of them were raised by himself, and

the others in his immediate neighborhood. One cow was reserved for the use of his family, and his statement refers to only ten of their number. During the six months from the first day of March to the first day of September, Mr. Ellsworth certifies that he has made four thousand three hundred and thirty-three pounds of cheese, and ninety-eight pounds of butter —reckoning three pounds of cheese to one of butter, the whole product of his dairy in cheese is four thousand six hundred and twenty-seven pounds, which at nine and one-fourth cents per pound amounts to $427.99. Seven of the calves were reserved by himself to raise, and three were sold to the butchers; four were sired by the celebrated Durham bull, "Count," and the others by a bull of equally good points though of less extended reputation. The net profits of the swine fed from the offal of the dairy, he estimates at seventy-five dollars. None of his cows have had any other feed than hay of the best quality, and pasture, during the time of this trial, and the average product of each cow, reckoning Mr. Ellsworth's calves reserved for raising and three sold to the butcher, at the same average value as those of the other competitor, during the months from March first to September first, is seventy-four dollars and eleven cents per head, amounting in the aggregate to $741.19.

Mr. Robinson's dairy consists of seventeen cows of various ages, ranging from three to eleven years, all of them grade Durhams. A portion of the herd was raised by himself, and the others were purchased in his immediate neighborhood. He reserved one cow for the use of his family and the family of a neighbor, and produced from the other sixteen cows from the first day of March to the first day of September, five thousand four hundred and fifty-three pounds of cheese, which valued at nine and one-fourth cents per pound, is equal to $504.40. Fourteen calves were sold and three reserved, and the average price obtained for those sold was $23.82, and valuing those reserved for raising at the same price, we have the aggregate of $404.94, as the value of the calves. The net profits of the swine, fed from the waste of his dairy, he estimates at $82.40, and the milk sold at $6.40, making in the aggregate the sum of $998.14, or an average product for each cow of $62.38. Mr. Robinson's cows were fed with good hay, from the first of March to the time of going to grass, with the addition of one quart of

Indian meal per day to each cow; since that time, with nothing but grass.

While your committee have, in the exercise of their official duties, observed the fair proportions and excellent points of the animals composing the herds of dairy cows submitted to their inspection, in the pens to-day, and have perused the carefully prepared and highly gratifying statements of their owners, a feeling of regret has mingled with their meditations, that in this great county, famed as it is through all the country for its productions of good butter and extraordinarily good cheese, the dairy interest should be represented here by only two competitors, and that in a department of agriculture which is calculated as much, if not more than any other, to call into exercise the best and highest faculties of the farmer,—his reason, his judgment, his ambition and his intellect,—and lead him to the grandest results, both of pleasure and profit, so few have chosen to give us the result of their experience, or a sight of those animals whose generous returns for the labor and care bestowed upon them, in milk, butter and cheese, are filling the homes of the farmers of Worcester county with so many of the comforts and luxuries of life.

When it is considered how important an interest the dairies are to the farmers of this section of the State, in a pecuniary point of view; that the milk yielded by the cows of the county gives an annual product of more than a million dollars, it certainly becomes us to inquire whether, with a little more pains-taking in the selection and breeding of animals; a closer study of the recorded experiences of skilful breeders, both in this country and in Europe; and a practical test of the result of our own conclusions upon our own farms, we may not make the business of the dairy a greatly increased source of enjoyment and profit.

Your committee believe that there is no farmer in Worcester county so rich as to afford to keep a poor cow, and they feel equally confident that there is none so poor but he may afford to have one good one; and by a poor cow we mean the ordinary old fashioned degenerate stock of the country, which in the height of the season can only half fill the pail, and whose coarse hair, thick hide and gaunt proportions are constantly reminding us of that vision of the wicked ruler, narrated in the

Scriptures, and of the interpretation thereof, foretelling, as it did, future years of leanness and poverty. The sight of seven kine coming up from the river side, "ill favored and lean fleshed," might well be deemed, even by an uninspired soothsayer, an augury of future years of misery to their owner, while the sight of an equal number of our improved breeds would afford equally satisfactory assurances that years of plenty and domestic comforts were in store for their fortunate possessor and his family.

Your committee do not feel called upon in this report to discuss the peculiar merits for dairy purposes of all the different breeds of cattle, for the opinions of practical farmers are so much at variance, and the influences of soil, location, and feeding are so numerous, that it would be impossible for them to recommend, with any degree of propriety, any one breed as best for the dairy under all circumstances; but they may be allowed to protest against the continuance of that unthrifty and suicidal policy which prevails upon too many farms, and which in the very face of all the knowledge which has been derived from the experience of such men as Colling and Bakewell in the past, still persists in the propagation and rearing of inferior cattle, and which, acting upon the principle that a calf of any breed is a calf, and will in time become an ox or a cow, rescues every year from the knife of the butcher a worthless progeny of young animals, which can never be a credit or a source of profit to the owners, or add to the aggregate wealth of the State.

With all the aids to improvement which at the present day are in his possession, the New England farmer who realizes at all the nobility and dignity of his vocation, ought to be ashamed to devote himself only to the milking and rearing of *ordinary* stock; nay, more than this, he ought to be ashamed not to give some little portion of his time, attention, and means, to its improvement, by judicious crossings with the improved stock of the country; which, thanks to the public spirit and enterprise of a few men in the community, and to the interest created by this and kindred institutions, is now accessible to all.

The good book tells us, that even in the olden time, men did not expect to gather grapes of thorns, or figs of thistles; but some of our modern farmers would seem to be less wise than

they, who at the present time expect to rear profitable stock for the dairy, by breeding their coarse, small-uddered cows, to any bull they can find, without the slightest regard to the laws of successful breeding. To us, it is a matter of constant surprise, that intelligent farmers, who are so careful to select for their seed corn, only the plumpest and soundest ears, who must even know the pedigree of a squash, before they will plant from it, and who will not commit to the earth the seeds for an acre of onions without some guaranty from the seedsman, such as Sam Weller required of the vender of veal pie, viz.: that "he was quite sure he knew the 'voman as màde it," will not exercise at least some degree of similar caution and judgment in the reproduction of their neat cattle.

Do the farmers of Worcester county need practical illustrations of the correctness of the views which we are attempting to present to their consideration?—they have only to contrast the numerous fine herds which are to be found at the present time upon the farms, of Barre, New Braintree, Hardwick and vicinity, with those which predominate in some other parts of the county. Those herds owe their origin to the efforts of a few intelligent and public spirited individuals, who have ingrafted some of the best Durham blood, upon well-selected specimens of the "Old Red Native Stock," of New England, until they have by such repeated judicious crossings, obtained, we might say, a race of milkers, which possess the distinguishing characteristics of the thorough-bred stock, and which can very generally be relied upon, as with pure blooded animals, to transmit their excellent qualities to their descendants.

The efforts made many years since, by a distinguished citizen of this county, who was an active member of our society, the late Mr. Williams, of Northborough, should not in this connection be forgotten, for to him we believe belongs the high honor of having first introduced into this county, if not into the State, one of the finest specimens of the Durham breed of that branch known as the Denton, or Teeswater, whose descendants, whether grades or thorough-breds, even to the third and fourth generation, show in their superior qualities for the dairy, the excellent characteristics of their distinguished ancestry. We might go on and enumerate other instances of a similar nature, for the purpose of showing the good results of individual efforts in

the improvement of our dairy stock, by the introduction of specimens of other breeds into the county, such as the Alderneys or Jerseys, the Ayrshires and the Devons, which although unlike the Durhams in some of their leading characteristics, have contributed perhaps in no less degree to the improvement of our herds of neat cattle. In regard to the peculiar qualities of all the improved breeds and races of stock, "the intelligent farmer," who, as Emerson so beautifully and truthfully remarks, "above all men lives nearest to God," should be thoroughly conversant. He cannot afford to enter upon *rash* experiments, or blindly engage in a coarse of hap-hazard breeding, blending the blood of animals of the most unlike qualities, under the delusive idea that any kind of a cross will improve any kind of stock, when the recorded experience of the most successful breeders is always accessible to him, and when he may, if he will, learn beforehand, from the success of their efforts, just how to produce the exact qualities which he most desires, and which are best adapted to his location, his soil and his wants; and when he may, by the sacrifice of a little time, and a very little money, give the females of his herd access to the highest bred males of every breed, whose ancestry can be traced almost, if not quite, to the days of Comet and Hubbach, to Duke and Sir Dimple.

In concluding this report, the committee believe that they have a right to suggest to their brother farmers, who as yet have done nothing to advance in their day and generation the progress of agriculture in Massachusetts, except to till and to mow, to plough and to sow, the same acres in the same way, year after year, to contribute their mite, by a little personal effort, or a little pecuniary sacrifice, which latter can only be temporary, to the improvement of the dairy stock of the county. If you have a likely cow, who yields a large quantity of milk, of excellent quality, show your gratitude for such a boon, by breeding her to the best male of a stock possessing similar qualities, and do not let your love for roast veal induce you for a moment to imitate the folly of the ancient woman who killed the goose which laid the diurnal egg of gold.

By such simple means, and through such humble beginnings, can each farmer in Worcester county do something to promote the general interests of agriculture, as well as his own, and by

such means can the county of Worcester become, at no distant day, as famed for the superiority of its dairy stock, in all parts of the country, as are the counties of Durham and Devonshire in the father-land.

All of which is respectfully submitted.

THOMAS DREW, *Chairman.*

WORCESTER.

From the Report of the Committee on Grade Bulls.

The most of us are undoubtedly behind the times in the matter of improving our stock; perhaps not entirely on account of its small outlay, but because we are so habituated to our old way, it is exceedingly difficult to depart from it, so much so, that we are apt to ridicule new ideas as innovations, when at the same time our good sense inwardly tells us "we are wrong." To these we would say, just examine the condition of those who have bestirred themselves, who have taken advantage of new improvements, not only in rearing cattle, but in all other departments of farming, and see if it is any better than your own. Should their herds look better, their farms smoother and more productive, and their work be done quicker and easier, do not be so unreasonable as to attribute all these to good luck.

Your committee regret to see so few superior cattle from this immediate vicinity. A number nearly sufficient to fill these pens ought to be raised here and exhibited. As milk is the chief production of our farms, most farmers feel unable to raise their calves; they are consequently destroyed when two or three days old, unless bought up at a nominal price by those who fatten them for the market, or others whose faith in raising them on a decoction of hay tea and thin gruel, is much stronger than we should suppose the constitution of their cattle would be, after going through such a diet. The consequence is, as they are raising no cattle, their stock is depreciating, and more must be bought; the neighboring towns are ransacked, not often with good success. Good milkers command high prices, and many farmers are beginning to think the possession of them is of so much importance they hesitate to part with

them, even at high rates, on account of the uncertainty of replacing them.

Your committee do now respectfully recommend to farmers to take greater pains in raising their cattle—raise a better quality and more of them. If the definition of the term "grade," is correct,—which is in substance, "incapacity of transmitting with certainty,"—we should be cautious in using those animals, especially if we intend raising the calves. True it is, many of our best cows and oxen are grades; but it would be very strange indeed if we did not occasionally have a good animal out of the thousands raised, especially as the different breeds are more or less mixed all over the country.

There are a few native bulls that can be relied upon. These might be honored with the title of "full blooded," and they ought to be kept and used as long as possible. Many excellent ones have been slaughtered before their stock has been thoroughly tested, and oftentimes we have found out their good qualities too late. As full blooded animals are more reliable, your committee recommend the use of them when practicable; but there being a very few of them, most of us have not these opportunities. This could be remedied in a measure, by clubbing together and purchasing one. All have their opinions of the different breeds; but a club of farmers would hardly ever fail of getting the right one.

In short, make use of the best bulls; give the owners some encouragement to keep them; raise the heifer calves from your best cows; and in raising stock, do it with so observant an eye, and so understandingly that in case you are successful with one lot, you can, with some degree of certainty, raise another. Through this habit of destroying our best calves, and leaving to others that which we ought to do ourselves, we have nearly lost all traces of the celebrated "Denton." His stock is so mixed up as to nearly lose its identity, and not a bull of his breed can be found in England.

MARSHALL FLAGG, *Chairman.*

WORCESTER NORTH.

Statement of J. P. Reed.

The cow Fanny, which I offer for premium, is seven years old, of Holderness and Ayrshire breed, raised in Princeton, by myself. Time of calving, February 8, 1858. Of the quality of the calf the committee can judge. Last dried the last of December, 1857, just six weeks before calving; time of next calving, March, 1859. Keeping, nothing but pasture feed.

Weight and quantity of milk, beer measure, first week in June:

	MORNING.		EVENING.	
	Pounds.	Quarts.	Pounds.	Quarts.
June 1, ...	16.25	6.50	21.00	8.40
2, ...	17.25	6.90	20.25	8.10
3, ...	18.00	7.20	19.75	7.90
4, ...	16.00	6.40	21.50	8.60
5, ...	17.00	6.80	21.00	8.40
6, ...	16.50	6.60	20.00	8.00
7, ...	17.50	7.00	20.50	8.20
	118.50	47.40	144.00	57.60
			118.50	47.40
Totals, ...			262.50	105.00

Average weight per day, 37½ pounds; average measure, 15 quarts per day.

Weight and quantity of milk, beer measure, for the first week in September:

	MORNING.		EVENING.	
	Pounds.	Quarts.	Pounds.	Quarts.
September 1, . . .	15.25	6.10	18.50	7.40
2, . . .	15.50	6.20	18.50	7.40
3, . . .	15.25	6 10	18.25	7.30
4, . . .	15.00	6.00	19.00	7.60
5, . . .	15.25	6.10	18.25	7.30
6, . . .	15.75	6.30	17.75	7.10
7, . . .	15.50	6.20	18.50	7.40
	107.50	43.00	128 75	51.50
			107.50	43.00
Totals, ...			236.25	94.50

Average weight per day, $33\frac{75}{100}$ pounds; average measure, $13\frac{1}{2}$ quarts per day, seven months after calving.

When on trial we could not set all her milk for butter as we were obliged to use some of it, but it is of superior quality; we have made 158 pounds of butter this season, after using what milk we wanted, and selling some quarts besides. Said cow has never had any meal or roots.

From the Report of the Committee on Heifers.

To a great many of the members of this society that part of their stock which constitutes their dairy, is of more consequence than all the rest. Upon all such the question is often pressed, how can the best cows be procured, and their number kept complete, when vacancies occur from age, disease or accident? Is it better or more profitable to raise our own cows than to depend upon buying such chance animals as may come in our way? In the opinion of your committee, there can be but one answer to this question, and that is, raise your own dairy stock. And we are glad to find, from the large number and good quality of heifers on exhibition to-day that this opinion is becoming more prevalent among the members of this association. Without hesitation, then, we recommend increased attention to the rearing of heifer calves. Breed from the best cows you possess or can procure; and, as the good qualities of the animal probably depend quite as much on the male

progenitor as the female, make, when it is practicable, judicious crossings with such blood stock as have been tried and approved for their good milking qualities; or else, begin and carry out, long and patiently, such a process of selection and training as shall make the dairy excellency of your own cows so fixed and permanent that you can rely upon their offspring inheriting their own good properties. At any rate, raise your own heifer calves, and, in the end, it will be more economical and satisfactory.

C. C. Field, *Chairman.*

HAMPSHIRE, FRANKLIN AND HAMPDEN.

From the Report on Stock.

It is a mooted question among the agriculturists of our State, what breed of cattle, if any, will suit our farmers, and meet all their requirements; and if there is no one universally admitted to that position, how to allot the different breeds to the different localities, where each shall be found best adapted.

A good many Jerseys are introduced into the eastern part of the State, and for a man who keeps but one or two cows they do very well. The Jersey cows give by far the richest milk of any stock; sometimes as high as three-eighths cream, and they are often very deep milkers. Mr. Fay, the earnest and able Secretary of the old Massachusetts Society, has an Alderney cow which never is dry, and makes all the butter for his family, through the year.

The Jerseys may be pets, but they can never lead among the farmers. Their small size, unsymmetrical shape, and a little lack of hardihood, will forbid their general introduction into the Valley. One of the largest herds of that breed, is owned by Mr. Jonathan Bird, of Greenfield.

The Ayrshires, originally a Scotch breed, are now attracting more attention than formerly, and the Massachusetts Society for the Promotion of Agriculture,—which, by the way, has done more for the advancement of that science, in Massachusetts, and in the United States, than any other institution of the kind in the country,—has recently made a large and very valuable importation of this stock.

The Ayrshires are hardy, easily kept, and good milkers—perhaps as a race, better than any other—whole dairies averaging from 2,000 to 2,400 quarts of milk a year to each cow, and of a good quality. They will do very well on high keeping, and on being fed, take on fat readily and easily, which is evenly distributed with the lean, or well marbled, as butchers call it; three-year old steers dress from 700 to 850 pounds. How they will do for workers, we do not know. They have never been tried in this country, and where they originated horses do the entire farm work.

The Herefords make good working cattle, and make very good beef, easily; for milk they cannot be recommended. A friend of ours, owning a Hereford cow, once said that he might as well fill his pail with the blue sky of heaven, as to set it under a Hereford cow. As a general thing, too, they are not good handlers; and we remember the recommendation of a fancy farmer to us, when suggesting the thickness and hardness of the hide "that it was a capital thick hide and would protect him in all weathers."

Of all the different races, the Devon cattle are undoubtedly the best, purely as working oxen. They have a quickness of action, a degree of docility, and goodness of temper, and stoutness, and honesty of work, to which many teams of horses cannot pretend, and will exert their strength to the utmost and stand many a dead pull, which few horses could be forced to attempt.

Their activity, too, has made them of great service and value in their native county of Devonshire: during harvest time, and in catching weather, they are sometimes trotted along with the empty wagon, at the rate of six miles an hour, a degree of speed which no other ox but the Devon has been able to stand. Their beautiful forms, their bright red color, without a white hair, their handsome high heads, with the delicate curving horns, commend them to the eye of every one who has the least fancy for a fine ox, and a longer acquaintance only develops their great excellence. The Devon cows, as a general thing, have never been reckoned first rate as milkers, probably not equal to the Ayrshires. Probably, however, for the system of breeding, which we here adopt, of raising for the great uses

of the dairy, the draught and the shambles combined, the Durhams or "improved short-horns," are the best calculated.

Although for the dairy, the Ayrshires, the Jerseys, and the Devons, and perhaps the Herefords, too,—all have their friends and admirers, yet for the grazier and butcher, they cannot compete with the short-horns, whose early maturity, great aptitude to fatten, and large size, place them beyond competition, while as milkers we believe the short-horns, and the grades, on the whole, will stand pre-eminent. The steers are generally docile, easily trained, very powerful, and though not so quick and springy as the Devons, make excellent working oxen.

This, at any rate, seems to be the opinion of the farmers in this Valley, and it will not be easy to have this noble breed superseded by Ayrshires, Jerseys, or Devons, so long as Paoli and Wells Lathrop can show such superb stock as we examined.

WORCESTER.

From the Report of the Committee on Working Oxen.

Are not our working oxen turned to the slaughter at too early an age? Steers are usually brought into the work at three years old, but not to hard labor generally until they are five years old; and oftener than otherwise, they are slaughtered at six years old.

At six years old the ox is fitted for all work, but not for the same amount of endurance as the ox of seven years old. Most oxen do not come to maturity till they are seven years old; and from seven to nine years old will perform an equal amount of labor with the five years old ox, with less fatigue; with the same fatigue he will do a greater amount of work in a given time. We can place more confidence in an ox eight years old, than we can in an ox of four years old only, at which age many are brought to the test, and often severely injured. If in our work we farmers come to a "hard pull," the old ox generally has to take it, because he is better able to stand under it.

The reason generally assigned for the early slaughter of the ox is, "he has come to his growth." So when there is no more increase of bone to be made, the poor animal is laid aside. Now, we think that this is a great mistake, for he is laid aside just at the time when he is becoming the most profit-

able in the service of his owner. If growth for the slaughter is all that is looked for, why not let the steers (after selecting a suitable number for oxen) grow, and not stunt them by labor, and let the work be done by older cattle, cattle that have been trained and found faithful in all things pertaining to them.

We did similar service for this society some fifteen to twenty years since, and on the present occasion we could not but contrast the age of the oxen, as well as the manner in which they performed their task, with the age of the cattle and their performance in former years.

On the present occasion the oxen were generally four and five years old, and showed more of good training than of superior strength. In years long gone by, oxen were on trial on these occasions, from six to nine and more years old, perhaps not so well matched, but it was seldom that there was a pair introduced for trial that did not do ample credit to their own ability and to their owner's skill in training them. They could and did back as well as draw a load. But few oxen can be found that cannot draw, while but few are to be found that can back the same load handsomely.

THOMAS W. WARD, *Chairman.*

From the Report of the Committee on Steers.

Your committee had an opportunity to notice during the trial, what early training, skill and gentleness can accomplish in bringing into service the strength, bone and sinew of the working steer. A pair of two years old steers, exhibited by J. M. Forbes, of Boylston, were put to the cart, and made to do the same work that was required of the three years old. This they executed handsomely, all but the backing up the inclination, and in this they succeeded better than several that were on trial, and did all that could possibly be expected of steers of that age, though not above the average size or strength. Another pair of two years old steers, exhibited by J. P. Reed, of Princeton, were made to draw the load required in the trial of oxen. Their accomplishment of the task was duly appreciated by the hearty cheers of the crowd who witnessed the performance.

Your committee inferred from this exhibition, that if two years old steers of ordinary size can be made to do the work of

common oxen, and to do it as well, before they are half grown or matured, preparing steers for the yoke ought to be a special trade, which should wholly occupy the time of those whose natural temperament and ability render them peculiarly fitted for the business. The well trained and fully developed ox is a powerful animal, and can be made, if rightly governed, to do great work for the farmer. How few working oxen there are, that are well matched in strength and tractability. There are thousands of them owned by the farmers of Massachusetts to-day, that would not and could not make so good an appearance on the cattle show grounds, as the two pairs of two years old steers exhibited this day. This should not be. So much latent, unemployed strength in the ox, is one of the great wastes in the economy of farming. The farmer cannot afford it; for it costs no more, if it does as much, to keep an ox whose muscles are well trained and fully developed, each set of which is ready at any moment to perform its own peculiar office in the most economical manner, than an ox of the same size and weight, which by a defect in his early training can be made to do hardly one-half the amount of work.

Your committee, also, are convinced more than ever that it will not pay to raise *scrub* steers. Many farmers are so American, thorough-bred, native-born, that any breed of cattle that has a foreign name attached to it, is condemned with prejudice, and without trial, and is not appreciated for what merit it really does possess. It costs but little more to raise a good, well proportioned steer than an inferior one; but there is a great difference in their value when they become three or four years old. One of your committee had an opportunity to notice this difference in the manner of raising steers, and consequently in their value. Two droves of Vermont cattle came into town on the same day. One came from a section of the State where the improvement of the stock was rapidly progressing, by the introduction of foreign and improved breeds a few years ago; the other came from a section where but very little attention had been given to this object. A casual observer could discern at once the superior excellence of the one over the other. The cause of this was apparent, and upon inquiry proved real. The result was as will naturally be supposed. Quick and ready sales, at advanced prices, were made from the more excellent

drove, while the inferior found a dull market. One pair of three years old steers in the latter were sold for sixty dollars, while another pair, in the former, of the same age, weighing 3,000 pounds, were disposed of at $140. Supposing that the difference per head between the two droves, in consequence of superior keeping, blood, or both, was two dollars, there would have been a gain in that drove of two hundred, of four hundred dollars over the other.

Believing that as the steer is, so the ox will be, your committee cannot help urging the importance of raising good steers for early training and work.

Your committee also would suggest for your consideration, that a premium be offered for work best performed by steers or oxen without the touch of lash or goad.

W. F. Wheeler, *Chairman.*

HOUSATONIC.

From the Report of the Committee on Working Oxen.

The ox is valuable, first for his labor, second, for beef. Did the value of the ox cease with his labor, many of those points that are now bred for, might be neglected without loss of power. It is a fact, that the ox that is heavy in his coarse parts, and light in those that are most valuable when slaughtered, is often a courageous and an enduring worker; while the ox of perfect form possesses equal powers of endurance. He is first sought after for service, commanding a remunerating price for raising, and when his work is done, and he is driven a beautiful fat ox into market, finds a ready sale.

Farmers should not breed oxen for their labor, but for their flesh, or in other words a model ox will perform promptly all necessary labor.

Second, farmers should breed such oxen as will yield the most flesh, and the least bone, or in other words, such oxen as will carry the most and best beef to the shambles. If the position taken is correct, the farmer should not, need not play "Blind Man's Buff," but with an unsealed eye, acquaint himself with the principles of breeding, learn what family of animals possess the most good points, what cross can be made that will sustain and develop all the points necessary to consti-

tute a perfect ox. The great law that like produces like, "though it is not invariable," is an important consideration for all stock growers. If good qualities are propagated by the union of animals possessing good qualities, and if it is desirable to propagate a race of animals, that do not deteriorate by breeding, "in and in," the Ayrshire, Devon, Durham and Hereford, come to us as the self-preserving families.

In relation to the Ayrshire ox, the pen of the historian has ever been inkless, and it is only through record of the Stockbridge and Lenox Farmers' Club, that we learn that they possess great hardihood of constitution and the elements for early maturity. The action, docility and tractability of the Devon ox is second to no other, and from its uniformity of color it is easily matched; its beef is of a fine quality, though it does not attain to the weight of many other breeds, and is inclined to be (when slaughtered) minus in some of the better points.

The Hereford family is entitled to a test trial by the farmers of Berkshire. With good points, good actions and good constitutions, they ought not to be excluded from our hillsides, for the *lone* reason that their faces are white.

The eye would be slow to weep, could it always range among the Durham family and view the splendid forms of their oxen. Like the trees of the forest, the full bloods have their appropriate clime and soil. The annual exhibitions of Durham oxen, steers and cows, prove beyond a doubt, that our New England clime is congenial to their growth, and that the sweet grasses and waters of Berkshire will nourish and nurture the massive frame of the Durham.

D. D. KENDALL, *Chairman.*

WORCESTER.

From the Report of the Committee on Fat Cattle.

All animals, to fat well, must not only be fed well at stated hours, but must be made comfortable at all times, by giving them warm quarters when the fattening operation commences; and as they increase in fat, colder quarters, even under open sheds on the snow, in preference to a tight barn, with boards matched and every crack closed to keep out the air. A very fat ox is seldom if ever cold, and always requires the pure air

to breathe. It is so with a very fat hog, and all other animals; all need a pure cold air in proportion to their amount of fat. Such being the fact, fat cattle should have separate apartments from other animals, where the cold air can be admitted by degrees, as the fat is taken on. All animals should be made very fat, as all the profit in fattening is in putting on the last hundreds, when the animal eats but half as much and fattens twice as fast.

CHARLES BRIGHAM, *Chairman.*

FEEDING STOCK.

ESSEX.

Report of the Committee on the Comparative Value of Crops as Food for Cattle.

No experiments or tests illustrating this subject have been submitted for premium, and the committee regret that it is so, having earnestly hoped that upon a subject so important to all concerned many such experiments would be made and thereby much light thrown upon the question, and each article of fodder have its appropriate value in the feeding of stock permanently established as far as possible. Scientific men have experimented carefully upon this question, though perhaps none in our own country, and we believe few farmers fail to satisfy their minds to some extent in regard to it, but such is the difference in the subjects of the experiments, in the period and manner of making them, in the object desired to be obtained, in the condition and character of the food used, (though the latter may be of the same variety even in all cases,) that a noticeable difference exists in the results and they are conflicting and contradictory.

Though upon a subject so broad, and influenced by such a variety of circumstances, it is difficult to obtain strictly correct conclusions, yet by numerous experiments, carefully made and detailed, the comparative value of various articles of fodder can be sufficiently established to be of much advantage to the feeder; and to this end it is desirable that those who are employed in this branch of farming, record their experiments

with minuteness and accuracy for the benefit of those who have not their experience, and thus whatever information is gained may be permanently secured.

It was the opinion of Boussingault, who made numerous experiments in the feeding of stock, that the relative value of the crops employed for fodder was in proportion to the amount of nitrogen they severally contained—and he arranged some of these articles in the following order, producing equal effects in feeding, when consumed in their usual state of dryness:—

Hay from mixed grass,	100	pounds.
Hay, second crop,	75	"
Hay from clover in flower,	75	"
Pea straw,	64	"
Lentil straw,	114	"
Indian corn straw,	240	"
Barley straw and wheat straw,	520	"
Oat straw,	550	"
Swede turnips,	676	"
Sugar beet,	669	"
Carrots,	382	"
Beans,	23	"
Peas,	27	"
Indian corn,	70	"
Buckwheat,	55	"
Oats,	60	"
Linseed cake,	22	"
Barley,	65	"

The subject can hardly, however, be made practical to us as farmers, unless we resolve it into its various parts and consider them separately. So different are the objects of the farmer in feeding stock, that an article desirable and valuable for one purpose may be almost useless for another, and to ascertain the relative merits of different food we cannot well do so as regards all the purposes of feeding collectively. Many experiments and tests are therefore to be made, and will be valuable if they make plain to us the method of feeding requisite for the attainment of any of these ends. We hope that during the coming year, whether this premium continues to be offered by the society or not, these tests will be made and published. In summer,

when green food is abundant, we question the superior advantages of any other course of feeding. But in winter it is desirable to economize so bulky and valuable an article of fodder as hay; it is therefore for the interest of the farmer and quite as much so for the stock, to use mixed food.

Says Professor Johnston: "The skilful feeder will occasionally change the kind of food; he will not attempt to maintain his stock on any kind of food which does not contain a sufficient supply of every one of the kinds of matter which the body requires. He will adapt the kind and quantity of food to the age of the animal and to the purposes for which it is fed."

No kind of winter food is sufficiently complete in itself, to enable an animal for a length of time to afford the greatest possible return to the feeder, unless the animal is one, which having for a long time afforded profit to its owner, only requires a season of rest to recuperate its exhausted stores, and unless the feeder has no eye to present return, the whole system of winter feeding being artificial. Three centuries ago the timely advice of Tusser to the English farmers was to store up their beef in November, when oxen, which were fat upon the green food of summer, began to grow thin and which lived through the winter partly on the fat stored up in time of plenty, no fresh beef being seen from Martinmas to Easter. It is since the commencement of the present century that the difference between heat-producing and flesh-forming substances, has been noticed, and cattle have been fed according to established principles.

The feeding of stock embraces several objects requiring for all practical purposes two peculiar modes of feeding; although, when examined minutely, the ingredients employed by the animal in the constitution of its frame are numerous. But it is sufficient for our purpose that we adopt two methods with special reference to the following objects:—

1. The growth of the animal, increase of muscle in working cattle and the production of cheese.

2. The increase of fat and the production of butter.

Food having a large proportion of albumen, caseine, &c., is especially calculated to bring about a good result, when the object of the feeder is to produce some of the first mentioned returns.

Not having experiments of our own to illustrate this point, we quote the table of Boussingault.

Theoretical quantities of different kinds of vegetable produce, having equal effect in the growth of muscle:—

Hay, ...	10	Potatoes, . . .	28
Clover hay cut in flower, .	8	Old potatoes, . . .	41
Lucerne, . . .	8	Carrots, ...	35
Second crop, . . .	8	Turnips, ...	61
Green clover in flower, .	34	White cabbage, . .	37
Green Lucerne, . .	35	Vetches, . . .	2
Wheat straw, . . .	52	Peas, ...	3
Rye straw, . . .	61	Indian corn, . . .	6
Barley straw, . . .	52	Wheat, ...	5
Oat straw, . . .	55	Rye, ...	5
Pea straw, . . .	6	Barley, ...	6
Vetch straw, . . .	7	Oats, ...	5
Potato leaves, . . .	36	Bran, ...	9
Carrot leaves, . . .	13	Oil cake, ...	2

In feeding for the increase of fat and production of butter, it is necessary to employ food rich in vegetable oils; for these two objects one method of feeding is mainly available and will secure the end desired, though some of the vegetable oils be more appropriate to the increase of fat than others, and some be peculiarly adapted to the production of butter, and though the observation of Mr. Horsfall, whose essay upon the management of dairy cattle is a most valuable acquisition to agricultural literature, be true: "It is worthy of remark that experience states that rich pastures used for fattening, fully maintain their fertility through a long series of years; while those used for dairy (butter) cows require periodical dressings to preserve their fertility."

If we can economically make the distinction spoken of here respecting the different qualities of oils, so much the better. Shall not the experiments of the coming year illustrate this matter in respect to the winter food of fattening and butter-making stock?

That oleaginous plants are most productive of fat and butter, when fed to cattle, is abundantly proved by the experience of

numerous practical and scientific men. This is the general rule; an exception, however, has been found in the comparative results of linseed and bean meal in the produce of butter by Dr. Thompson, the latter producing more butter than the former, though containing less oil, and he gives as a probable reason for this, the constituents of bean meal being in the natural proportion to restore the waste of the animal system.

Some of the more common articles of cattle food contain of oil, per centum as follows:—

Hay, ...	2.68	Linseed cake, . .	11.41
Indian corn, . .	5 to 9	Malt combs, . . .	2.96
Barley, . . .	2.5	Bean straw, . . .	2.23
Oats, ...	5.6	Pea straw, . . .	1.5
Beans, . . .	2+	Potatoes, . . .	0.3
Linseed, . . .	11.00	Turnips, (starch gum) .	10.0
Rape seed, . . .	11.63	Carrots, . . .	0.4
Cotton seed cake, . .	16.47	Clover hay, . . .	3.0
Bran, . . .	5.56	Indian corn straw, .	1.7

We would refer the reader to the following sources of information upon this subject:—

Johnston's Agricultural Chemistry, chapters xx., xxi.

Thompson's "Food of Animals."

Horsfall's Essay on Dairy Management, published in the Appendix to Flint's Treatise on Dairy Farming.

Boussingault's Rural Economy.

J. Royal Agricultural Society, England, volume 3, page 81–258.

Morton's Cyclopedia of Agriculture, Article Nutrition.

We are anxious that our own farmers should not only investigate this subject, but record their conclusions and their experiments.

G. P. Sargent, *Chairman.*

WORCESTER NORTH.

Statement of John Brooks, Jr.—Experiments in Feeding Milch Cows.

I fed the following cows and heifers last winter and spring, and now beg leave to call your attention to the following Tables.

FIRST TRIAL.

DORA—*Is* 4 *years old, April,* 1857; *seven-eighths Ayrshire; dropped calf Aug.* 13, 1857; *is expected to come in June* 30, 1858.

Date.	Live w't at 12 M.	Weight of Hay.	Water. Morning.	Water. Evening.	Water. Total.	Milk. Morning.	Milk. Evening.	Milk. Total.	Cream. Morning.	Cream. Evening.	Cream. Average.	Manure.	Temperature. 7 o'clock, A. M.	Temperature. 2 o'clock, P. M.	Temperature. 9 o'clock, P. M.	Temperature. Average.
1857.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	per ct.	per ct.	per ct.	lbs.	above 0.	above 0.	above 0.	above 0.
Dec. 19, . . .	870	24	41.50	28	69.50	4.75	3.81	7.56	1.50	1.90	1.70	44	31	27	25	27.66
Dec. 20, . . .	866	32	26	40	66	4.75	3.56	8.31	1.40	1.90	1.65	59	21	27	21	23
Dec. 21, . . .	874	24	33	32	65	5.37	3.50	8.87	1.50	1.70	1.60	52	21	32	29	27.33
Dec. 22,* . .	865	30	35	37	72	4.81	3.62	8.43	1.60	1.80	1.70	50	32	36	31	33
Dec. 23, . . .	870	28	36	30	66	4.94	3.56	8.50	1.40	1.90	1.65	49	26	30	31	29
Average daily weight,	869	27.60	–	–	67.70	–	–	8.33	–	–	1.66	50.80	–	–	–	27.99

Ten pounds or four quarts of milk from the above trial made ten ounces of butter.

NORA—*Is* 4 *years old, April,* 1857; *seven-eighths Ayrshire; dropped calf July* 29, 1857; *is expected to come in May* 30, 1858.

Date.	Live w't at 12 M.	Weight of Hay.	Water. Morning.	Water. Evening.	Water. Total.	Milk. Morning.	Milk. Evening.	Milk. Total.	Cream. Morning.	Cream. Evening.	Cream. Average.	Manure.	Temperature. 7 o'clock, A. M.	Temperature. 2 o'clock, P. M.	Temperature. 9 o'clock, P. M.	Temperature. Average.
1857.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	per ct.	per ct.	per ct.	lbs.	above 0.	above 0.	above 0.	above 0.
Dec. 19, . . .	852	23	33	20	53	4.44	3.25	7.69	1.50	1.80	1.65	48	31	27	25	27.66
Dec. 20, . . .	864	30	19	13	32	5.44	3.19	8.63	1.80	1.80	1.80	60	21	27	21	23
Dec. 21,* . .	862	22	39	23	62	5.19	3.44	8.53	1.40	1.50	1.45	55	21	32	29	27.33
Dec. 22, . . .	863	25	19	16	35	4.62	3.32	7.94	1.50	1.60	1.55	58	32	36	31	33
Dec. 23, . . .	862	28	30	24	54	5.19	3.44	8.63	1.60	1.70	1.65	60	26	30	31	29
Average daily weight,	860.60	25.60	–	–	47.45	–	–	8.28	–	–	1.62	56.20	–	–	–	27.99

Ten pounds or four quarts of milk from the above trial yielded ten ounces of butter.

* Handful of salt.

SECOND TRIAL.

DORA.	Live w't at 12 M.	Weight of Hay.	Cotton Seed M'l.	Water.			Milk.			Cream.			Manure.	Temperature.			
				Morning.	Evening.	Total.	Morning.	Evening.	Total.	Morning.	Evening.	Average.		7 o'clock, A. M.	2 o'clock, P. M.	9 o'clock, P. M.	Average.
1857.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	per ct.	per ct.	per ct.	lbs.	above 0.	above 0.	above 0.	above 0.
Dec. 24,* .	872	26	2.75	33	32	65	–	–	8.33	–	–	1.63	50.80	–	–	–	–
Dec. 25,† .	856	26	2.75	45	36	81	6	4.75	10.75	1.70	2.20	1.95	62	11	17	16	14.66
Dec. 26, .	860	20	2.75	31	36	67	6.56	4.50	11.06	1.70	2.30	2.00	61	15	13	13	13.66
Dec. 27, .	861	21	2.75	42	37	79	7.19	5	12.19	1.80	1.80	1.80	79	4	12	9	8.33
Dec. 28, .	851	18	2.75	31	32	63	7	5	12	1.50	2.10	1.80	72	28	31	28	9
Dec. 29, .	842	25	2.75	29	36	65	7	4.56	11.56	1.50	2.10	1.80	71	28	28	25	27
Av'g daily w't,	854	22	2.75	–	–	71	–	–	11.51	–	–	1.87	69.60	–	–	–	18.53

Ten pounds or four quarts of milk from the above trial yielded twelve ounces of butter.

NORA.	Live w't at 12 M.	Weight of Hay.	Cotton Seed M'l.	Water.			Milk.			Cream.			Manure.	Temperature.			
				Morning.	Evening.	Total.	Morning.	Evening.	Total.	Morning.	Evening.	Average.		7 o'clock, A. M.	2 o'clock, P. M.	9 o'clock, P. M.	Average.
1857.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	per ct.	per ct.	per ct.	lbs.	above 0.	above 0.	above 0.	above 0.
Dec. 24,* .	870	26	2.75	51	41	95	–	–	8.28	–	–	1.62	56.20	–	–	–	–
Dec. 25,† .	879	28	2.75	48	43	91	6.50	4.44	10.94	1.60	1.90	1.75	64	11	17	16	14.66
Dec. 26, .	880	20	2.75	37	36	73	7.44	4.62	12.06	1.60	1.90	1.75	54	15	13	13	13.66
Dec. 27, .	862	26	2.75	23	51	74	8.14	5	13.14	1.90	1.90	1.90	70	4	12	9	8.33
Dec. 28, .	870	18	2.75	33	36	69	8.50	5.19	13.69	1.50	1.80	1.65	67	28	31	28	29
Dec. 29, .	852	25	2.75	29	37	66	9	5.19	14.19	1.50	1.90	1.70	68	28	28	25	27
Av'g daily w't,	868.60	23.40	2.75	–	–	74.80	–	–	12.83	–	–	1.75	64.60	–	–	–	18.35

Ten pounds or four quarts of milk from the above trial yielded ten ounces of butter.

* Fed on English Hay.

† Handful of salt.

THIRD TRIAL.

DORA.	Live w't at 12 M.	Weight of Hay.	English Turnips.	Water. Morning.	Water. Evening.	Water. Total.	Milk. Morning.	Milk. Evening.	Milk. Total.	Cream. Morning.	Cream. Evening.	Cream. Average.	Manure.	Temperature. 7 o'clock. A. M.	Temperature. 2 o'clock, P. M.	Temperature. 9 o'clock, P. M.	Temperature. Average.
1858.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	per ct.	per ct.	per ct.	lbs.	above 0.	above 0.	above 0.	above 0.
Jan. 3,* .	861	27	15	–	–	66	–	–	8.33	–	–	1.66	50.80	–	–	–	–
Jan. 4, . .	860	28	15	36	31	67	5.75	4.32	10.07	1.30	1.70	1.50	84	35	42	41	39.33
Jan. 5, . .	874	24	15	39	24	63	5.75	4.32	10.07	1.50	2	1.75	66	37	40	26	34.33
Jan. 6, . .	876	26	15	40	35	75	6.44	4 19	10.63	1.30	2 20	1.75	72	13	14	15	14
Jan. 7,† .	875	22	15	37	34	71	6.56	4.37	10.93	1.50	2	1 75	75	21	24	10	18.33
Jan. 8, . .	868	22	15	30	40	70	6.25	5	11.25	1.50	2.10	1.80	77	1	12	5	6
Av'g daily w't,	870.70	21.40	15	–	–	69.20	–	–	10.59	–	–	1.71	74.80	–	–	–	22.39

Ten pounds or four quarts of milk from the above trial yielded eleven ounces of butter.

NORA.	Live w't at 12 M.	Weight of Hay.	English Turni, s.	Water. Morning.	Water. Evening.	Water. Total.	Milk. Morning.	Milk. Evening.	Milk. Total.	Cream. Morning.	Cream. Evening.	Cream. Average.	Manure.	Temperature. 7 o'clock, A. M.	Temperature. 2 o'clock, P. M.	Temperature. 9 o'clock, P. M.	Temperature. Average.
1858.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	per ct.	per ct.	per ct.	lbs.	above 0.	above 0.	above 0.	above 0.
Jan. 3,* .	862	28	15	–	–	65	–	–	8.28	–	–	1 62	56.20	–	–	–	–
Jan. 4, . .	856	24	15	29	12	41	7	4.50	11.50	1.30	1.50	1.40	79	35	42	41	39.33
Jan. 5, . .	862	24	15	42	20	62	6.50	4.50	11.00	1.40	1.60	1.50	58	37	40	26	34.33
Jan. 6, . .	876	26	15	40	18	58	7.06	4.32	10.38	1.30	1.70	1.50	61	13	14	15	14
Jan. 7,† .	864	22	15	35	38	73	7.12	4 25	11 37	1.50	1.70	1.60	68	21	24	10	18.33
Jan. 8, . .	868	24	15	36	32	68	7.12	4.41	11.56	1.50	1.80	1.65	65	1	12	5	6
Av'g daily w't,	865.20	24	15	–	–	60.40	–	–	11.16	–	–	1.53	66.20	–	–	–	22.39

Ten pounds or four quarts of milk from the above trial yielded nine ounces of butter.

* This and three days previous, fed on English Hay.

† Handful of salt.

FOURTH TRIAL.

DORA.	Live w't at 12 M.	Weight of Hay.	Wei't of R. Bagas.	Water. Morning.	Water. Evening.	Water. Total.	Milk. Morning.	Milk. Evening.	Milk. Total.	Cream. Morning.	Cream. Evening.	Cream. Average.	Manure.	Temperature. 7 o'clock, A. M.	Temperature. 2 o'clock, P. M.	Temperature. 9 o'clock, P. M.	Temperature. Average.
1858.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	per ct.	per ct.	per ct.	lbs.	above 0.	above 0.	above 0.	above 0.
Jan. 9,	864	21	15	36	36	72	5.75	4.56	10.31	1.40	1.90	1.65	69	16	31	32	26.33
Jan. 10,	870	24	15	39	36	75	6.75	4.44	11.19	1.40	1.90	1.65	63	22	32	32	28.66
Jan. 11,*	850	26	15	25	48	73	7	4.62	11.62	1.40	2	1.70	64	25	37	48	36.66
Jan. 12,	851	22	15	20	54	74	5.88	5.75	11.63	1.20	1.70	1.45	70	38	39	28	35
Jan. 13,	862	22	15	23	25	48	6.06	4.50	10.56	1.30	1.90	1.60	62	21	31	30	27.33
Av'g daily w't,	859.40	23	15	–	–	68.40	–	–	10.06	–	–	1.61	65.60	–	–	–	30.79

Ten pounds or four quarts of milk from the above trial yielded ten ounces of butter.

NORA.	Live w't at 12 M.	Weight of Hay.	Wei't of R. Bagas.	Water. Morning.	Water. Evening.	Water. Total.	Milk. Morning.	Milk. Evening.	Milk. Total.	Cream. Morning.	Cream. Evening.	Cream. Average.	Manure.	Temperature. 7 o'clock, A. M.	Temperature. 2 o'clock, P. M.	Temperature. 9 o'clock, P. M.	Temperature. Average.
1858.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	per ct.	per ct.	per ct.	lbs.	above 0.	above 0.	above 0.	above 0.
Jan. 9,	852	21	15	24	34	58	7.12	4.44	11.56	1.50	1.50	1.50	60	16	31	32	26.33
Jan. 10,	850	24	15	26	40	66	7.44	4.44	11.88	1.50	1.50	1.50	60	22	32	32	28.66
Jan. 11,*	846	26	15	28	48	76	7.56	4.25	11.81	1.40	1.50	1.45	56	25	37	48	36.66
Jan. 12,	850	22	15	20	46	66	6.81	4.56	11.37	1.40	1.50	1.45	60	38	39	28	35
Jan. 13,	855	22	15	21	20	41	6.95	4.50	11.45	1.40	1.50	1.45	56	21	31	30	27.33
Av'g daily w't,	850.60	–	15	–	–	61.40	–	–	11.61	–	–	1.47	58.40	–	–	–	30.79

Ten pounds or four quarts of milk from the above trial yielded nine ounces of butter.

* Handful of salt.

FIFTH TRIAL.

DORA.	Live w't at 12 M.	Weight of Hay.	Wei't of Carrots.	Water. Morning.	Water. Evening.	Water. Total.	Milk. Morning.	Milk. Evening.	Milk. Total.	Cream. Morning.	Cream. Evening.	Cream. Average.	Manure.	Temperature. 7 o'clock, A. M.	Temperature. 2 o'clock, P. M.	Temperature. 9 o'clock, P. M.	Temperature. Average.
1858.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	per ct.	per ct.	per ct.	lbs.	above 0.	above 0.	above 0.	above 0.
Jan. 14,	872	26	15	36	40	76	5.95	4.75	10.60	1.50	1.90	1.70	62	31	40	32	34.33
Jan. 15,	858	24	15	20	20	40	6.62	4.44	11.06	1.60	1.80	1.70	61	28	32	31	30.33
Jan. 16,*	856	25	15	40	60	100	5.87	4.50	10.37	1.80	1.40	1.60	62	35	44	37	38.66
Jan. 17,	860	22	15	20	38	58	6.00	5.25	11.25	1.30	2.10	1.70	60	28	30	22	26.66
Jan. 18,	854	20	15	20	45	65	6.87	4.31	11.18	1.30	1.80	1.55	62	18	20	18	18.66
Av'g daily w't,	860	23.50	15	–	–	69.80	–	–	10.89	–	–	1.65	61.50	–	–	–	29.73

Ten pounds or four quarts of milk from the above trial yielded ten ounces of butter.

NORA.	Live w't at 12 M.	Weight of Hay.	Wei't of Carrots.	Water. Morning.	Water. Evening.	Water. Total.	Milk. Morning.	Milk. Evening.	Milk. Total.	Cream. Morning.	Cream. Evening.	Cream. Average.	Manure.	Temperature. 7 o'clock, A. M.	Temperature. 2 o'clock, P. M.	Temperature. 9 o'clock, P. M.	Temperature. Average.
1858.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	per ct.	per ct.	per ct.	lbs.	above 0.	above 0.	above 0.	above 0.
Jan. 14,	836	26	15	22	50	72	6.95	4.31	11.26	1.50	1.60	1.55	52	31	40	32	34.33
Jan. 15,	850	24	15	20	20	40	7.19	4.50	11.69	1.20	1.60	1.40	64	28	32	31	30.33
Jan. 16,*	848	25	15	40	45	85	7.19	4.37	11.56	1.20	1.20	1.20	62	35	44	37	38.66
Jan. 17,	844	22	15	20	36	56	7	4.50	11.50	1.00	1.60	1.30	62	28	30	22	26.66
Jan. 18,	847	20	15	20	40	60	6.75	4.56	11.31	1.60	1.80	1.70	60	18	20	18	18.66
Av'g daily w't,	845	23.50	15	–	–	62.60	–	–	11.46	–	–	1.43	60	–	–	–	29.73

Ten pounds or four quarts of milk from the above trial yielded nine ounces of butter.

* Handful of salt.

35½

SIXTH TRIAL.

DORA.	Live w't at 12 M.	Weight of Hay.	English Carrots	Water. Morning.	Water. Evening.	Water. Total.	Milk. Morning.	Milk. Evening.	Milk. Total.	Cream. Morning.	Cream. Evening.	Cream. Average.	Manure.	Temperature. 7 o'clock, A. M.	Temperature. 2 o'clock, P. M.	Temperature. 9 o'clock, P. M.	Temperature. Average.
1858.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	per ct.	per ct.	per ct.	lbs.	above 0.	above 0.	above 0.	above 0.
Jan. 19–20,*	860	23.50	–	–	–	49.80	–	–	10.89	–	–	1.65	61.50	–	–	–	–
Jan. 20, .	–	–	15	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Jan. 21, .	854	28	15	30	40	70	5.95	4	9.95	1.70	1.80	1.75	47	37	32	20	29.66
Jan. 22,†	856	24	15	20	60	80	5.62	4.44	10.06	1.40	1.90	1.65	59	18	9	15	14
Jan. 23, .	872	24	15	20	40	60	6.12	4.38	10.50	1.50	1.90	1.70	61	27	20	9	18.66
Jan. 24, .	865	25	15	20	50	70	6.19	4.44	10.63	1.50	1.80	1.65	62	38	36	26	33.33
Jan. 25, .	870	24	15	20	40	60	6.56	4.19	10.75	1.50	1.80	1.65	62	36	45	38	39.66
Av'g daily w't,	863.40	25	15	–	–	68	–	–	10.38	–	–	1.68	58.20	–	–	–	27.06

Ten pounds or four quarts of milk from the above trial yielded ten ounces of butter.

NORA.	Live w't at 12 M.	Weight of Hay.	English Carrots.	Water. Morning.	Water. Evening.	Water. Total.	Milk. Morning.	Milk. Evening.	Milk. Total.	Cream. Morning.	Cream. Evening.	Cream. Average.	Manure.	Temperature. 7 o'clock, A. M.	Temperature. 2 o'clock, P. M.	Temperature. 9 o'clock, P. M.	Temperature. Average.
1858.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	per ct.	per ct.	per ct.	lbs.	above 0.	above 0.	above 0.	above 0.
Jan. 19–20,*	845	23.50	–	–	–	62.60	–	–	11.46	–	–	1.43	60	–	–	–	–
Jan. 20, .	–	–	15	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Jan. 21, .	846	25	15	20	40	60	6.06	3.69	9.75	1.40	1.80	1.60	42	20	37	32	29.66
Jan. 22,†	848	23	15	30	56	86	5.62	3.88	9.50	1.60	1.80	1.70	47	15	18	9	14
Jan. 23, .	854	22	15	20	35	55	6.25	4.06	10.31	1.40	1.80	1.60	50	9	27	20	18.66
Jan. 24, .	850	23	15	22	45	65	6.25	4.25	10.50	1.40	1.80	1.60	58	26	33	36	33.33
Jan. 25, .	852	22	15	32	30	60	6.06	4.25	10.31	1.40	1.80	1.60	60	38	38	45	39.66
Av'g daily w't,	850	23	15	–	–	65.20	–	–	10.07	–	–	1.62	51.40	–	–	–	27.06

Ten pounds or four quarts of milk from the above trial yielded ten ounces of butter.

* Fed on English Hay.

† Handful of salt.

SEVENTH TRIAL.

DORA.	Live w't at 12 M.	Weight of Clover Hay, 2d Crop.	Water.			Milk.			Cream.			Manure.	Temperature.			
			Morning.	Evening.	Total.	Morning.	Evening.	Total.	Morning.	Evening.	Average.		7 o'clock, A. M.	12 o'cl'k, Noon.	9 o'clock, P. M.	Average.
1858.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	per ct.	per ct.	per ct.	lbs.	above 0.	above 0.	above 0.	above 0.
Jan. 26-30,* .	863	27	–	–	69	–	–	8.33	–	–	1.66	50.80	–	–	–	–
Jan. 31, .	861	29	40	72	1.12	5.06	4.06	9.12	1.60	1.60	1.60	55	9	17	8	11.33
Feb. 1, .	874	26	35	50	85	6.44	5.06	11.50	1.70	1.90	1.80	67	6	21	10	12.33
Feb. 2, .	852	26	40	60	1	6.75	6.40	11.25	1.70	1.70	1.70	55	31	32	33	32
Feb. 3,† .	864	33	40	60	1	6.37	6.07	12.44	1.90	1.80	1.85	57	28	35	29	3.67
Feb. 4, .	875	28	40	60	1	7.06	5.19	12.25	1.50	1.90	1.70	58	25	28	21	24.67
Aver. daily wei't,	865.20	28.40	–	–	99.40	–	–	11.31	–	–	1.73	58	–	–	–	22.20

Ten pounds or four quarts of milk from the above trial yielded eleven ounces of butter.

NORA.	Live w't at 12 M.	Weight of Clover Hay, 2d crop.	Water.			Milk.			Cream.			Manure.	Temperature.			
			Morning.	Evening.	Total.	Morning.	Evening.	Total.	Morning.	Evening.	Average.		7 o'clock, A. M.	12 o'cl'k, Noon.	9 o'clock, P. M.	Average.
1858.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	per ct.	per ct.	per ct.	lbs.	above 0.	above 0.	above 0.	above 0.
Jan. 26-30,* .	850	25	–	–	86	–	–	8.28	–	–	1.62	56.20	–	–	–	–
Jan. 31, .	859	24	40	52	92	3.88	3.56	7.44	1.70	1.80	1.75	56	9	17	8	11.33
Feb. 1, .	854	28	40	46	86	5.50	3.36	9.86	1.60	1.80	1.70	57	6	21	10	12.33
Feb. 2,† .	860	26	42	60	102	6.75	4.44	11.19	1.50	1.70	1.60	56	31	32	33	32
Feb. 3, .	865	33	30	60	90	6.88	5.00	11.88	1.50	1.70	1.60	53	28	35	29	3.67
Feb. 4, .	875	28	42	55	97	6.50	5.56	12 06	1.50	1.70	1.60	57	25	28	21	24.67
Aver. daily wei't,	862.60	27.80	–	–	93.40	–	–	10.49	–	–	1.65	55.80	–	–	–	22.20

Ten pounds or four quarts of milk from the above trial yielded ten ounces of butter.

* Fed on English Hay.

† Handful of salt.

EIGHTH TRIAL.

DORA.	Live w't at 12 M.	Weight of Hay.	Corn Meal.	Water.			Milk.			Cream.			Manure.	Temperature.			
				Morning.	Evening.	Total.	Morning.	Evening.	Total.	Morning.	Evening.	Average.		7 o'clock. A. M.	2 o'clock, P. M.	9 o'clock, P. M.	Average.
1858.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	per ct.	per ct.	per ct.	lbs.	above 0.	above 0.	above 0.	above 0.
Feb. 5-7,*	865	27	–	–	–	69	–	–	8.33	–	–	1.66	50.80	–	–	–	–
Feb. 8,	–	–	2.75	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Feb. 9,	854	23	2.75	40	40	80	6.12	4.19	10.31	1.40	1.60	1.50	57	19	21	24	21.33
Feb. 10,	870	21	2.75	37	35	72	6.56	4.50	11.06	1.40	1.90	1.65	57	25	32	11	22.66
Feb. 11,†	876	24	2.75	23	37	60	6.50	4.25	10.75	1.60	1.60	1.60	61	1	5	0	2
Feb. 12,	876	24	2.75	38	40	78	5.63	4.12	9.75	1.80	1.80	1.80	56	0	15	9	8
Feb. 13,	880	24	2.75	35	40	75	6.06	4.38	10.44	1.70	1.90	1.80	58	1	13	9	7.66
Av'g daily w't,	871.20	23.80	2.75	–	–	73	–	–	10.46	–	–	1.67	57.80	–	–	–	12.33

Ten pounds or four quarts of milk from the above trial yielded ten ounces of butter.

NORA.	Live w't at 12 M.	Weight of Hay.	Corn Meal.	Water.			Milk.			Cream.			Manure.	Temperature.			
				Morning.	Evening.	Total.	Morning.	Evening.	Total.	Morning.	Evening.	Average.		7 o'clock, A. M.	2 o'clock, P. M.	9 o'clock, P. M.	Average.
1858.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	per ct.	per ct.	per ct.	lbs.	above 0.	above 0.	above 0.	above 0.
Feb. 5-7,*	838	25	–	–	–	62	–	–	8.28	–	–	1.62	58	–	–	–	–
Feb. 8,	–	–	2.75	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Feb. 9,	834	24	2.75	30	35	65	5.94	4.25	10.19	1.50	1.70	1.60	47	19	21	24	21.33
Feb. 10,	838	22	2.75	33	30	62	6	4.12	10.12	1.40	1.60	1.50	47	25	32	11	22.66
Feb. 11,†	838	22	2.75	38	37	75	6.06	4.31	10.37	1.60	1.60	1.60	55	1	5	0	2
Feb. 12,	836	24	2.75	23	38	61	6.62	3.94	10.56	1.60	1.70	1.65	58	0	15	9	8
Feb. 13,	836	24	2.75	25	40	65	6.50	3.81	10.31	1.70	1.70	1.70	58	1	13	9	7.66
Av'g daily w't,	836.40	23.20	–	–	–	65.80	–	–	–	–	–	1.61	53	–	–	–	12.33

Ten pounds or four quarts of milk from the above trial yielded ten ounces of butter.

* Fed on English Hay.

† Handful of salt.

HORSES.

MIDDLESEX.

From the Report of the Committee on Stallions.

Your committee would strenuously insist that the class of "Stallions" should be five years old and over. The observance of this suggestion would relieve the committee of embarrassments that they have labored under the past, as well as the present year, and would allow of proper justice being done to four year old stallions when classed by themselves, which obviously they cannot receive under the present improper classification; and owners of the four-year-olds that were presented, will at once perceive the force of the above remarks, and see that their animals could not, under the existing rules, receive such notice as they were evidently entitled to under proper regulations.

A stallion, for a stock horse, should possess qualifications of the highest order. He should be sound and without a blemish, and of good constitution, with capacious and prominent chest and hind parts to match—of fair size, say from 950 to 1,000 pounds weight, and with good limb and muscle; with a good open countenance, a fine ear, an intelligent eye, a clean head nicely set upon a graceful neck, and that well fitted to a good sized body, well proportioned in all its parts,—all supported by smooth limbs of sufficient bone and muscle, terminating in good sound hoofs, with accompanying style and action, and in connection with a decided blood to transmit and impress these qualifications on the foal. Then we have a stallion to which we can take a mare of corresponding or even inferior developments, and with reasonable certainty look for a colt of equal merit with the sire and dam.

If it is speed that we wish, we must take families of a trotting race to accomplish that object. The tendency to speed alone, in trotting, to the sacrifice to many indispensable qualifications to the farmer, should not receive the sanction of a farming community. A good walker, however, can justly receive the approbation of every farmer in Middlesex, who has to travel the hard and wearisome journey from the distant towns to Boston, say from three to five times the week, with his

loads of produce. We will all go in for the fast horse, in this respect, without a dissent.

The compact Morgan is a good specimen of a stallion to breed from. He exhibits a body well formed in all its parts, with limb and muscle developed in a thorough and sufficient manner, with grace and docility, and a sound constitution, and with an acknowledged pedigree, and will transmit this combination of excellent parts through successive generations. To this and to similar classes, the farmer must look for his horse stock on the farm.

Samuel H. Rhoades.

WORCESTER NORTH.

From the Report of the Committee on Draught Horses.

We believe the horse, and particularly the draught horse, to be the most useful animal that moves upon the face of the earth. We do not usually appreciate blessings and privileges fully until we are deprived of them. Consider then, for a moment, our condition if the horse were stricken from existence. The world almost comes to a stand still, particularly the agriculturist. What is it that ploughs our land, carries our manure, covers our seed, cuts our hay and grain, threshes the latter, moves all our produce to our barns and market? The draught horse. Of what use are our canals without him? It is true steam may be used; but without the horse, canals with steam, or even the railroad with its engine and car would become almost a dead letter, for the horse has first to transport all our produce and freight from different parts of the land before steam becomes available. The horse is capable of being trained and educated to do almost any thing. We believe there is a great lack on the part of the owners of horses in training them when young for after service, for then it can be done with little or no whipping, and there is scarcely any animal so tractable, or that will appreciate kindness so well as the horse, or that has so much pride in appearing well. The horse has always been man's most faithful servant, in time of war and peace, and the draught horse is his indispensable servant. The fancy horse, like ladies' jewelry, is well enough in its place, but not very essential.

L. Stockwell, *Chairman.*

HAMPSHIRE, FRANKLIN AND HAMPDEN.

From the Report of the Committee.

We hope the day is not far distant when every man will be a good judge of horse flesh, and every person who owns one, the possessor of a superior animal. No one can afford to keep a poor animal of any kind; much less a horse. It costs no more to care for a really valuable animal, than it does, or ought to, to maintain an inferior one; though we are free to say that a person conscious of possessing a poor beast is more inclined, generally, even if it be a dog, to bestow kicks than caresses upon it. The farmer can better afford to keep a good horse than a good ox. Speed, endurance and docility, are of as much advantage for farm labor, as for pleasure riding, and the farmer can only obtain these desirable qualifications by first selecting good stock, taking good care of it and seeking constantly to make it better.

Even the simple trials of speed, at our agricultural fairs, which are as necessary to prove the good qualities of the horse, as the drawing match is to prove the capabilities of the ox team, are regarded by many as an innovation. But happily a better sentiment is prevailing in this respect, and the race track is coming more and more to its legitimate and appropriate use. Every means for the improvement and benefit of this noble animal ought to be hailed with pleasure by all classes, and every one ought to be willing to contribute his mite to the consummation of so glorious an object.

There is a marked improvement in this class of animals from year to year, visible in the shows of this society. The present exhibition brought forward some very fine animals, particularly among the young stock. This is beginning right. Breed good stock, rear it well, and the poor, ill-fed, snail-paced, "rack o'bones" that prevail in many localities, will soon be consigned to oblivion, to be succeeded by a race of hardy, nimble-footed, finely formed, and every way superior animals. It is not necessary to tell the farmers of the Connecticut Valley their duty in this respect; they know it, and knowing, will perform.

J. R. TRUMBULL, *Reporter.*

HAMPDEN.

From the Report of the Committee on Farm Horses.

The question arises, "What qualities should farm horses possess?"

1. They should be well matched; sometimes they are matched simply in color, no matter what their dispositions may be. A span of horses well matched should have the same temperament; that is, one should not be quick and nervous, always ready to start at the first signal, and the other slow and phlegmatic, never ready to move until started by the whip; and a span of horses perfectly matched in size and color, but of different actions, are ill matched. Therefore, to be a good span of well matched horses, they should have the same spirit and disposition, as well as color and size.

2. What should be the weight of a span of farm horses? On this point there will be a difference of opinion, according to the different kinds of farm work. One farmer lives near a good steady market, consequently he sells a large portion of the produce of his farm, and hazes his manure, which makes a large amount of carting, consequently he wants a heavy pair of horses. Another farmer feeds on his farm the greater part that he raises, hazing little or no manure, thereby saving much carting. On such a farm a lighter pair of horses will answer. The span to which we awarded the first premium weighed about 2,200 pounds, which in the opinion of your committee, is plenty large enough, and perhaps a span of 1,000 pounds horses in common ordinary farm work, will be as economical for the farmer as a heavier span.

3. They should be good walkers, as that is their usual gait. In ploughing, for instance, there would be the difference of some days' work in ploughing thirty or forty acres of land, as to whether they walked at the rate of four or four and a half miles an hour, or three miles an hour; and it makes some difference whether a horse can plough out corn as fast as three men can hoe, or no faster than two can hoe. Therefore we say that farm horses should be fast walkers, born such, and not made such by the use of the whip. And if all the noise and pains and money that is made and paid for these fast thorough-

bred horses have a tendency to improve and quicken the walking qualities of horses, farmers may consider themselves as gaining some capital out of this jockey business. There are other qualities which we hope other committees will bring out.

William H. Atkins, *Chairman.*

SHEEP.

HAMPSHIRE, FRANKLIN AND HAMPDEN.

Report of the Committee.

We must confess great disappointment at the exceedingly meagre show of sheep, in the enterprising, fertile and thrifty county of Hampshire, with its sweet pastures and teeming meadows, and we could but glance back to the days when that noble man, the pride of his town, his county, the whole State, —Hon. I. C. Bates, with Samuel Henshaw and the Shepherds, in common with a few leading agriculturists and statesmen, was one of the most eminent and successful in the introduction to this country of the Merino, and afterwards of the Saxony sheep,—a measure which, forwarded as it was by the far-seeing men of that age, did more to benefit the farmer and to stimulate the manufacturer, than any other object of the kind ever attempted here. The fine-woolled or Merino sheep, were first introduced into this country just before the last war, when the most sagacious of our statesmen began to realize the necessity of cultivating manufactures, and growing the material necessary to supply them—a policy which Great Britain had sedulously discouraged in these colonies.

Previous to this, however, there were many sheep in the country, of no known or distinct breed, called native sheep, but really imported at various times by various people, from various flocks, but without care, and almost entirely for their wool, which, although too coarse for fine fabrics, was consumed upon the spinning wheel and loom at home. The meat was very little regarded, and was not in general use.

The Saxony sheep were next introduced under the idea of greater hardiness,—the first being imported by Samuel Henshaw, in 1823.

Since then, the culture of sheep has undergone a very decided change in this country. Then, fine-woolled sheep were almost entirely raised. There were to be seen some of what were called native sheep,—that is, sheep grown so long in this country, that they possessed none of the distinctive marks of the breeds from which they originally sprung, though all of them came from Great Britain; and there were also some called Irish Smuts, middling large sheep, and possessing some good points, but lacking the most essential qualities, and entirely unreliable in the breeding. There were then none of the thorough-bred Leicester, South Down, Cotswold, or other large or middle-woolled sheep.

There are several reasons why our farmers have changed their system of sheep raising, from the small fine-woolled to the larger middle-woolled sheep.

The fluctuations of the price of wool, from fifty-four cents down to thirty, the enormously increased importation of Australian wool, and the superior advantages of the West and South with their immense sheep walks, together with the losses attendant on a large flock, have operated one way to drive out the fine-woolled sheep, while the greatly increased demand, the ready market, and quick returns for mutton and lambs, with less trouble, and a smaller flock, have contributed to the same purpose, in a different way. No doubt, too, the constant destruction of sheep by dogs, has had much to do in bringing it about.

The larger breeds will produce more lambs, and by good keeping, both their quantity of wool is increased and their tendency to breed, and their capacity to bring up their lambs. Such sheep well kept will yean and suckle an average of a lamb and a half to a ewe, or fifteen lambs to ten ewes. Large, early lambs well started, and allowed a pint of meal daily, for the last two months, will readily find a market here at $5 per head, in May or June. The care and trouble of a flock of such sheep, bears no proportion to that attendant on a large flock of fine-woolled sheep. The larger breeds are more prolific, hardier, less liable on account of their size, to be worried by

dogs, less liable to disease, not so apt to ramble, and bringing quicker returns are more profitable to moderate farmers.

Then for mutton, the Merino ewe, at the age of six or seven, becomes so broken-mouthed by the teeth breaking and wearing up, that it is almost impossible to fatten her, even if her slender and unprofitable frame was worth covering with fat, and she is killed for the sake of her pelt, and what small amount of tallow she will render. The middle wools, however, when six years old, are capable of being made into superb mutton, from their great aptitude to take on fat; and carcasses averaging 110 to 120 pounds at ten cents per pound, and a dollar for the pelt, making twelve or thirteen dollars, show a handsome profit on the expense of raising and fattening. These are probably the considerations which have produced the change in sheep husbandry in this country. Of the various breeds, probably the South Down is at present the greatest favorite; the Cotswold is larger with somewhat coarser staple, but shapes up beautifully and fattens readily. We hope to see about here some of the latter varieties, which seem to be adapted to our purposes, as the New Oxfordshire Downs and the Shropshire Downs, got by crossing the improved South Downs for a succession of years, with the Cheviot, the Suffolk, and Norfolk. It is certain that there is no branch of agricultural pursuits more profitable than the raising of sheep, prudently managed, and it would be a most pleasant sight to see pens equally well filled with fine, large sheep, as with cattle.

This concludes our report of a most excellent show of stock. We desire to express our thanks to the president, and your attentive, efficient and able secretary, for kind attentions shown us.

We have written perhaps more minutely and diffusely than is usual, or perhaps than would be desired; but the subject is an engrossing one. Our agricultural societies are great institutions, and our cattle shows the great holidays of the year, and to complete this great system, we now need some well arranged plan of agricultural education for farmers' sons, where they might perfect themselves in this profession, the most honest and honorable, the most healthy and happy of all callings, among the sons of Adam.

For the committee,

James S. Grennell, of Greenfield.

SWINE.

MIDDLESEX NORTH.

From the Report of the Committee on Swine.

The Mackay breed, which the committee are disposed to place at the head of swine in New England, was originated from thirty-five to forty years ago by Capt. John Mackay, a Boston sea-captain, who owned a farm in Weston of this county. In his voyages he picked up the best specimens of swine he could find in various parts of the world, and bred them together on his farm; from time to time, as he made desirable acquisitions he would still further raise the character of his breed. Some of the animals thus produced were inclined to keep constantly fat, from three weeks old up, and to grow to a large size, frequently at eighteen months old weighing 600 pounds. From these latter animals the breed was kept up. In the mean time, the animals Capt. Mackay scattered through the community about him were negligently cared for, and soon lost the strict characteristics of a breed. Hence there have been many Mackays in name that were almost any thing else in nature, thereby injuring the reputation of the breed. In 1834 the worthy captain sold his animals to Col. Jaques, who continued the development of them; such was the heedlessness of swine raisers that some twelve or fifteen years afterward the breed was found to be annihilated, except in the yards of Col. Jaques. Now that it has once more begun to spread through the country, may we not believe that the increased interest in agricultural matters will prevent its again running out?

In conclusion the committee would urge upon their fellow-members and fellow-citizens increased attention to the rearing of swine. They are aware that many persons of education and otherwise, and indeed, some agricultural writers and even committees on swine, have within a few years joined the Jews and Mahometans in decrying and defaming the pig. They say he is an unclean and unhealthy animal, and that the use of his flesh leads to scrofula, consumption and various other diseases. Now your committee contend that while the pig is oftentimes constantly unclean, he would be otherwise if his owner would

let him. He likes to have his wallow and then wash off in clean water ready for his clean straw; he may be occasionally diseased, especially in the liver; but this is because his master confines him in filth, frequently shutting out the light and air, and compelling him in a damp, dark cellar to breathe the exhalations of the manure of all the stock on the farm. Surely no other animal could pass the ordeal with any thing like the health of the hog. Then the food—what disgusting stuff often forms the sole ration of the pig, just because he will eat it. Let him have light, air, water and corn or boiled vegetables and milk for the body of his diet, and he becomes a healthy, wholesome animal, and his flesh in moderate quantities, worthy food for mankind. As to the connection between scrofula and pork eating, your committee consider the doctrine a humbug. They are aware that the name *scrofula* is derived from the Greek word *scrofa*, which means hog, but there the connection ends. The Hindoos who never eat pork, and the impoverished classes in Europe who seldom taste any kind of meat, are among the greatest sufferers from scrofula. On the other hand the bacon and hog-and-hominy negroes of the South and the pig-devouring natives of the South Sea are wonderfully exempt from the disease; so, too, of the Chinese, whose almost sole meat consists of immense numbers of pigs, as the chairman of the committee well knows from experience, gastronomic and otherwise. As to consumption, there is high medical authority for the use of cod-liver oil, mainly for its supply of carbon, a purpose that a good pork diet would supply nearly as well. Except in hot weather, it is pretty thoroughly proved by high authority, that good corn fed pork in moderation conduces to health, and to the durability of the system. The diseases attributed to its use seem almost entirely confined to those who do not touch it, while the robust health that its accusers seek to obtain by its disuse, seems generally to be enjoyed by those who moderately but regularly make it an article of diet. We therefore think pork worthy of the estimation in which it has ever been held in New England, and the animals that produce it entitled to increased consideration.

John A. Goodwin, *Chairman.*

MIDDLESEX SOUTH.

Statement of Joseph Jennison.

I have been in the habit of fattening my pork on corn and oat meal, and from my experience I am persuaded that oats can thus be fed out to swine to as much profit as to the horse, especially when the present rates are taken into consideration. But let prices vary as they may, I have always preferred a mixture of about one-third oats. There is sufficient nourishment in oat and corn meal to promote the growth, as also the health of the animal. Nor is there so great danger of over-feeding as with pure corn meal. My method is to commence with an average of from three to four quarts to each per day, and increase gradually the quantity as the appetite of the animal will allow. At an advanced period, eight or ten quarts will be no more than enough. The last fortnight or more, I give meal and water, reduced to the consistency of dough, and as much as they will take. In feeding, the hunger of the animal should be regarded, as some require and will take more than others. During the earlier and intermediate stages of fattening, I use considerable milk; at a later period I give unground corn occasionally, usually at noon, when they receive nothing else. I feed three times each day. I have practiced scalding the meal when I have no milk for them, and find that not only does the animal relish it better, but appears to gain faster than when cold water is used. When I have them pretty well under way, I have thought they gained from two to three pounds daily. During the time of fattening, which occupies from three to four months, a thrifty pig may be made to weigh from five to six hundred. Below are the figures of three swine raised by myself. The then price of corn and oats, as well as that of pork, is given. The present prices are not fair rates. No account, as will be seen, is made of their benefit to the yard.

Three pigs, 300 lbs. each—900 lbs. at $6\frac{1}{2}$ cents,	$58 50
Kept them 5 months or 160 days, at 10 quarts per day, amounting to 50 bushels—$\frac{1}{3}$ oats, 16; corn, 34.	

34 bushels corn, 75 cents, ...	$25 50
16 bushels oats, 50 cents, ...	8 00
Expense of feeding, ...	10 00
	$102 00
3 pigs weighed when dressed, respectively, 513, 607, 723 pounds, amounting to 1,843 pounds, at $9\frac{1}{4}$ cents, ...	170 48
Net gain, ...	$68 48

POULTRY.

ESSEX.

From the Report of the Committee.

Communications were received from most of the exhibitors, the general characteristic of which was a great barrenness of interesting and profitable details. We present the following as containing facts which may be of value to the community.

Of the Brahma-poutres exhibited by him, Mr. Barnaby writes: "These chickens (seven pullets) were hatched the 10th of April. I have fed them altogether on common Indian corn and meal, with the exception of cooked, coarse meat once a week. They commenced laying the first of September, and have laid 106 eggs up to this date, September 29"—when four months and twenty days old. Of a cross between the pure Bolton Grey and Brahma-poutre, Mr. Warren writes: "They were hatched the 20th of May, and the pullets commenced laying the 16th of September"—when four months and fourteen days old. The Seabright bantams exhibited by Mr. Ives, were exceedingly beautiful. Mr. Ives presented the following statement: "The mother of the Golden Seabrights on exhibition (six in number) during the months of March, April and May layed 408 eggs, or 34 dozen in 92 days. I have kept at different times upwards of twelve different kinds of fowls, and as far as my experience goes, I pronounce the Seabrights the best laying fowls I have ever seen. Their eggs are larger in propor-

tion to the size of the fowls than the eggs of larger breeds. The expense of keeping them is very small; I could not estimate the expense of keeping mine, having kept them mostly upon the swill and crumbs from the house, but I can safely say that the expense is not over one-half that of larger breeds."

From accurate experiments made a few years since we found the cost of food consumed by a variety of black bantam was exactly one-half that consumed by ordinary breeds. Mr. Ives exhibited eggs of his Seabrights, which are of about the average size of the eggs of the Bolton Grey fowl of the first year's laying.

John I. Ladd, of Groveland, exhibited a hen with 57 chickens, all hatched by her and a portion of them raised by her during the past season. Mr. Ladd presented the following statement: "The father of this hen was of the Cochin China breed and her mother a Booby hen. The father of the chickens is a Brahma-poutre, the mother a China Booby. The hen was set March 11 on 19 eggs, and came off April 2 with 17 chickens; she was with these 22 days. From April 21 to May 15 she laid 24 eggs, and on the 16th of May she was set on these eggs and came off June 6 with 21 chickens. Her chickens were given to another hen to bring up. She commenced laying again on the 15th of June, and laid 18 eggs up to July 2. She was set again July 3 on these 18 eggs, and came off July 25 with 15 chickens, which were given to another hen. She commenced laying again August 5, and laid 15 eggs up to August 21; she was set August 22 on the 11 eggs, and came off September 14 with 11 chickens, and they are now with her." This statement indicates a fowl of a very hardy constitution, and wonderfully prolific both as a layer and as a setter. Mr. Ladd terms the hen a "Booby" hen; the hen is a large sized, deep bodied, short legged hen of the eastern breeds which were so widely disseminated a few years since, and might probably be as correctly called by either of the half dozen names by which these breeds are known. It appears that this fowl layed every day throughout the season when not setting or with her chickens, producing in the course of six months 57 eggs and 64 chickens.

We all remember the great "fowl fever," as it is termed, which spread through the country a few years since. It came and went—one of those spasms which sometimes afflict whole

communities, that reach their climax so rapidly and pass away so speedily that many who are among the afflicted are confounded when the reaction comes, having a dim idea of a disagreeable dream. A few cool headed sharpers took advantage of the fashionable mania which possessed the public, and in a grand round of villainy fleeced hundreds of their fellow citizens whose enthusiasm had for the time got the better of their reason; and what is the most wonderful feature of the whole delusion, one of these sharpers mistook his scoundrelism for wit, and put himself on record in a work which for impudent rascality will long wait for a compeer. Very naturally a great reaction has followed upon this inflated enthusiasm, and thousands can now see in fowls only the reminder of their former folly. "One extreme follows another," is a true adage, and what in those days with so many was the height of the desirable, has changed about and now become the height of the ridiculous,—for it is human nature that a man should scorn a thing which he has used after a foolish manner, rather than the folly that so used it. To many, therefore, any propositions relative to the improvement of the poultry yard sound weak or have the ring of imposition in them, the whole subject being to their minds matter for pleasantry rather than a subject worthy the earnest, conscientious attention of an intelligent worker.

But when the poulterer at the close of the season strikes his balance, does he consider the difference between a stock of good laying hens and a stock of poor laying ones a joke? Would he not really prefer for breeding purposes a race good to hatch and rear chickens; and for his table a fowl with a full breast of fine, compact flesh, to one with a breast as sharp as the hull of a clipper ship with legs like her masts?—or a fat, juicy chicken to a lean, stringy one? and should a "bag of bones" be brought to his table, would he not find it rather a difficult matter to pick a joke out of it? Now these and kindred traits of excellence belong to some breeds of fowl more than to others. Why, then, not select such breeds in preference to the chance stock that is usually found in the barnyard? Enormous sums and great labor are expended to procure the purest blood of the best races of horses, cows, sheep, swine and of every species inhabiting the barnyard, while poor chanticleer almost

wholly excepted, since the late reaction is left alone to do his own crowing on his own dung-hill. Good traits just as certainly run in the blood of certain races of fowls as they run in the blood of certain races of horses, cows, sheep and swine. Why, then, should there not be as much outlay of labor and expense, in proportion to their value to the community, to procure pure races of excellent fowls as pure races of other stock?

Among the pure blooded breeds, the Black Spanish, Dorking, Bolton Grey, Guelderland, and a variety of the breeds which are known by the name "Brahma-poutre," stand highest in practical value; yet the poulterer will find it true of all highly bred fowls that a finer nervous organization is usually accompanied with less hardiness of constitution when young; which in pure breeds is often aggravated by too close breeding. Let the amateur, therefore, not be discouraged if in endeavoring to introduce either of the above varieties into his collection they should prove very delicate; let him try the same variety from some other stock, before he finally rejects them on such grounds. To state briefly the characteristics of the above breeds, which have established characters for themselves: of the Black Spanish we affirm that they are ready for the table at an early age, when they prove full breasted, small boned and fine fleshed; they begin to lay at an early period, are almost "everlasting" layers, being seldom or never broody, and their eggs of superior quality, are noble sized, weighing from twenty-five to thirty ounces to the dozen. Their rich plumage with its green gloss renders them very attractive. The objections to them are their wandering propensities and their nervous, fly-away organizations, which takes away one of the greatest attractions of fowls, docility. The Dorking is the fowl of old England. They mature very rapidly and have the fullest development of "white meat" of any fowl brought to the table. The eggs are very large and of excellent quality, and for all natural uses of fowls, for the table, for laying and setting, this breed ranks very high. The dorking is spreading fast over the country, and no doubt the public will gain thereby, provided only the hardier breeds are propagated. The white dorking is a smaller sized race than other varieties and of greater delicacy of constitution; some of the large speckled varieties will also be found to be so

wanting in hardiness when young as to render them valueless to the public at large.

The Bolton Grey when pure is a fowl of great beauty and a most excellent layer. If "bred to a feather," while the neck is pure white the mottling of black will pass entirely around the breast—a characteristic very rarely seen even in the premium fowls of our fair. In a lot recently imported from England, I notice that on one of my fowls the mottling is improved upon, by a lozenge-shaped white figure developed on each feather, giving the bird rare beauty. The objections to the Bolton Grey breed are serious ones. They mature for the table slowly, and are then poor in quality, of small size, and cold, bluish hue. Their eggs are very small. The hens have a bad habit of dying without leaving on record any sufficient cause therefor; you go into the coop and find one of your finest fowls on the nest for two or three days in succession with a comb rather unusually red; (now this redness of the comb is a certificate presented by other fowls in proof that their internal egg-producing apparatus is in full working order;) and you tell John that "really that Bolton Grey hen does beat all in the poultry line that was ever heard of, seen or read of; indeed you more than half believe she is but a mass of eggs slightly covered with feathers!" John, filled with respectful admiration approaches the prodigy with stealthy steps, looks closely and—proclaims her dead! Probably all who have ever reared the Bolton Grey fowl have had some such unfortunate experience. The Asiatic breeds which were so widely disseminated a few years since have been a nut for amateurs to crack. They have generally been denounced as, on the whole, a nuisance. Let them have fair play; many of them are ungainly, gaunt gormandizers, maturing very late, and then a large-boned sharp-breasted race; still there are some exceptions to the general rule. It will be noticed that three of the statements accompanying this report relate to one variety of the Asiatic breeds commonly known as "Brahma-poutre" fowl. The fowl termed "Booby," exhibited by Mr. Ladd, is undoubtedly nearly allied to that variety, and a better season's work than her's could not be anticipated from any breed of fowls. For early maturity no fowls could excel those of Mr. Barnaby, which began to lay at four months and twenty days from the egg, excepting those

exhibited by Mr. Warren, which were a cross between the Brahma-poutre and Bolton Grey, and began to lay when four and a half months old!

With such facts as these,—and from what we know of these gentlemen we believe them to be facts,—we cannot but except the variety of the so-called "Brahma-poutres" from the sweeping condemnation so usually applied to the whole race of Eastern breeds of late introduction. These Brahma-poutres, one of the most reliable breeders of which is Daniel Buxton, Jr., of Danvers, are a handsomer fowl than most of the larger sorts. From personal experience of this variety we are persuaded that though in common with all their race they are heartier eaters than our common fowls, yet as they may be raised on coarser food, the final cost will be but little additional. They are no great scratchers, and but little inclined to wander. We would not be understood to recommend this variety in preference to the other above mentioned breeds; indeed, were we to raise a single variety, we should prefer others to them which had finer flesh and smaller bones; but among a number of varieties, this deserves a place.

One word to those who have pure stock in their possession. Do not so far yield to the temptation of cross-breeding, as to lose your original pure stock; for remember that a cross breed, however desirable it may prove, cannot be relied upon to renew itself until bred distinct for many generations; while with the original stock, with the particular crosses made, you have material in your hands to produce the like at your fancy.

James J. H. Gregory, *Chairman.*

MIDDLESEX SOUTH.

Statement of J. H. Temple.

The undersigned submits the following statement: The "Plymouth Rock" fowls which I offer for premium, are a fair sample of my flock of thirty—twenty-eight hens and two roosters. These fowls have a free range over the grounds adjacent to my farm buildings; and in the summer pick up the largest share of their living. For eight months in the year I feed them, on an average, one quart of corn per day—in the

coldest weather in winter a little more, and in the mild weather of spring, somewhat less—besides an occasional meal of boiled bran, oats, and the refuse of the table. In winter they have access to my barn floor, and pick up scattering clover leaves. If the snow confines them to the hen-house, I give them late cut rowen hay—some raw vegetable food of this kind being necessary. They have constant access to air-slacked lime, or old plaster, and sand.

I feed the young chicks on coarse Indian meal, wetted with the least quantity of water that will serve to make it into pudding. A larger quantity of water than is barely sufficient to wet the meal, is injurious. Fine meal is also hurtful—the coarser the better. For fattening, I use clear corn; feeding as much as the fowl will eat; and without any raw vegetable food. The cost of rearing and keeping my fowls for a year is as follows:—

8 bushels corn, at 90 cents, ...	$7 20
4 " meal, " "	3 60
4 " oats, at 50 cents, ...	2 00
Grasshoppers, worms, &c., ...	00
	$12 80

This gives 43 cents as the cost per fowl for the year. From an experiment carefully made, a few years since, I am satisfied that the expense of keeping a fowl (the "Plymouth Rock" breed) for a year, where the flock is kept in an inclosure, and consequently depends wholly on the keeper for food, is from 58 to 60 cents.

The average market value of the chickens at four months old, has been 87 cents per pair. Average value per pound, when sold by weight, 14 cents.

The flock has laid eggs during the year, to the number of 2,880, equal to 240 dozen.

Value at 18 cents per dozen, . . .	$43 20
Deduct expenses, ...	12 80
Leaves, ...	$30 40

From this it appears that the annual net income per fowl, from eggs alone, is $1. Value of manure, 600 pounds, at three cents, $18.

Statement of Mrs. Caroline Winter.

In May, 1857, having one Bantam hen in my possession, I procured eggs and set her on them. I supposed at the time, they were the eggs of our common fowl, but a part of the pullets bear a strong resemblance to the Blueden variety; therefore we call them such. I raised from that brood six pullets, which I exhibit here, and propose to show their product and expense for one year.

Three of them commenced laying on the 1st of September, at less than four months old; the others later. I have kept an exact account of their eggs for one year from that date, which is 76 dozens. Four of them had broods, and we have raised 46 chickens. They have had a variety of food,—shelled corn, Indian meal, dough, mixed with boiled potatoes, buckwheat and oats, raw potatoes chopped fine, or grated, mixed with Indian meal. I think the water and starch contained in the raw potato, has a tendency to increase their eggs. When we have kept them shut up, I have chopped refuse pieces of meat for them, and pounded up bones from uncooked meat, which they devour greedily, but never burnt bones. I feel satisfied, even with my limited experience, that there is a good profit in raising chickens. A hen will lay as many eggs, and bring up a brood, as she will without doing so, as she must have rest.

Our fowls are shut up a part of the year. Their house is situated on the south side of the barn, where they have the benefit of sun and air, and also access to the earth under the buildings. These fowls are of medium size, flesh plump, skin yellow, and very nice for the table. The chickens brought a good price in the market. I think for fattening poultry, Indian corn the best food, but for the production of eggs, a variety of food is necessary.

PRODUCT OF EGGS AND CHICKENS.

76 dozen eggs, at 20 cents, ...		$15 20
46 chickens, at 30 cents each, ...		13 80
		$29 00

EXPENSE OF KEEPING.

Indian meal, four bushels, . . .	$4 00	
Shelled corn, four bushels, . . .	4 00	
Buckwheat and oats, one bushel, . .	1 00	
Potatoes, three bushels, ...	1 50	
		10 50
Profit, ...		$18 50

Statement of H. O. Stone.

In presenting the following statement of the method, expense and profit of keeping hens, there is no pretence of extraordinary results,—only a tolerably accurate account of what has been done under limited circumstances, for a series of years.

January 1st, 1855. Had a stock of fifty-two hens and six cocks.

Their feed for the year consisted of two barrels potatoes; one and a half bushels cob meal; five bushels ears; nineteen bushels corn; eleven bushels Indian meal; two bushels of oats; cost, $39.97.

Months.	Eggs laid.	Stock kept.
January, . .	26 dozen,	– –
February, . .	14 dozen,	– –
March, . . .	36 dozen,	– –
April, . . .	34 dozen,	– –
May, . . .	34 dozen,	– –
June, . . .	32 dozen,	– –
July, . . .	14 dozen,	– –
August, . . .	13 dozen,	46 hens, 2 cocks.
September, . .	9 dozen,	41 hens, 2 cocks.
October, . .	16 dozen,	36 hens, 2 cocks.
November, . .	13 dozen,	42 hens, 3 cocks.
December, . .	22 dozen,	– –

263 dozen eggs, at market price, ...	$51 06
In addition to eggs 34 fowls brought, . . .	15 93
	$66 99
Deduct worth of thirteen fowls to make stock as large as January 1, ...	5 20
Proceeds, ...	$61 79
Cost of keep for year, ...	39 97
Net profit, ...	$21 82

Several dozen eggs set not reckoned.

In addition to this, eight barrels and nineteen wheelbarrow loads of hen manure saved; the value of which can be estimated by those who have used this kind of fertilizer. During the year, corn and eggs, too, were very costly, the former ranging from $2.08 to $2.50 per bag; the latter from 16 to 28 cents per dozen. The hen-yard contains plum trees, and grape vines trained on the fence, which ordinarily would pay the interest on the cost of coops, &c.

January 1, 1856. Had a stock of 40 hens and 5 cocks. The feed for the year consisted of seven bushels of shelled corn; two and a half barrels cob meal; seven bushels oats; one-half bushel buckwheat; one and a half bags meal; four bags corn;

cost, ...	$26 86
Eggs set, $2.08; turpentine, 50 cents, . . .	2 58
	$29 44

Months.	Eggs laid.	Stock kept.
January, . .	9 dozen,	– –
February, . .	15½ dozen,	– –
March, . . .	12 dozen,	– –
April, . . .	19 dozen,	– –
May, . . .	19 dozen,	– –
June, . . .	23 dozen,	– –
July, . . .	21 dozen,	– –
August, . . .	8 dozen,	35
September, . .	12 dozen,	– –
October, . .	3 dozen,	33
November, . .	5 dozen,	40
December, . .	20 dozen,	– –

$157\frac{1}{2}$ dozen eggs, at market price, ...	\$35 14
20 fowls, ...	9 26
Whole proceeds, ...	\$44 40
Cost of keep, ...	29 44
	\$14 96
Deduct worth of fowls to make stock same as Jan. 1,	2 00
Net profit, ...	\$12 96

In addition to eggs and fowls, there were seven barrels of clear hen manure. In 1856, the price of corn ranged from \$1.60 to \$1.80 per bag: the price of eggs from 16 to 25 cents per dozen. The winter was unusually long and cold. A great quantity of snow fell.

1857. Began with a stock of 36 hens and 4 cocks. Their feed for the year consisted of one barrel cob meal; ten and a half bags of corn; four bushels oats; four and a half bags of meal; cost, ... \$32 02

Eggs set, ...	2 47
Whole cost of keep, ...	\$34 49

Months.	Eggs laid.	Stock kept.
January, . .	12 dozen,	– –
February, . .	9 dozen,	– –
March, . . .	24 dozen,	33 hens, 2 cocks.
April, . . .	17 dozen,	– –
May, . . .	21 dozen,	– –
June, . . .	$18\frac{1}{2}$ dozen,	32 hens, 1 cock.
July, . . .	17 dozen,	– –
August, . . .	10 dozen,	29 old hens, 1 cock.
September, . .	8 dozen,	– –
October, . .	9 dozen,	27 old hens, 1 cock.
November, . .	10 dozen,	22 old hens, 1 cock.
December, . .	22 dozen,	52 fowls, 44 hens, 8 cocks.

177 dozen eggs at market price, ...	$35 03
In addition to the eggs, 30 fowls brought, . .	13 57
Add the value of increase of stock, 12 fowls, .	4 00
Whole proceeds, ...	$52 60
Cost of keep for the year, ...	34 49
Net profit, ...	$18 11
By two bushels oats on hand, ...	1 00
	$19 11

Eight barrels of hen manure, and ten barrow loads of do. (The barrow loads consist of the droppings in the yard and chicken coops, scraped up, with loam intermixed. The barrels contained clear hen manure.)

January 1 to September 1, 1858. Commenced with 41 hens and 11 cocks. Their feed to September 1st, consisted of one barrel cob meal; one and a half bushels corn, (raised,) five bags of corn; two bags of oats; eight bushels meal, $20 57

Eggs set, ...	1 52
Whole cost, ...	$22 09

Months.	Eggs laid.	Stock kept.
January, . .	14 dozen,	– –
February, . .	22 dozen,	– –
March, . . .	20 dozen,	40 old hens, 4 cocks.
April, . . .	17 dozen,	– –
May, . . .	21 dozen,	– –
June, . . .	26 dozen,	40 hens, 1 old cock.
July, . . .	10 dozen,	– –
August, . .	13 dozen,	20 hens, (5 died.)

August 31,—On hand 22 chickens, making 43 on hand September 1.

120 dozen eggs at market price, ...	$25 16
Fowls brought, ...	10 16
	$35 32
Cost of keep, ...	22 09
	$13 23
By three fowls increase since January 1, . .	1 00
Net profit, ...	$14 23

Two and a half barrels of hen manure now saved. Price of corn from $1.60 to $2.16 per bag. Price of eggs, from 14 to 18 cents per dozen, except in January, when they were 22 cents.

These statements demonstrate that there is a profit in keeping hens in addition to the manure they make, although kept under circumstances not the most favorable. The fowls have been shut up in a coop 35 x 40 feet nearly the entire year, being allowed to range outside only about a month in the spring and two months in the fall.

They have had, besides the grain specified, the scraps from a small family, occasionally grass, refuse cabbages, broken bones, and rarely, pork scraps. They have also had access to heaps of old plastering and part of a barrel of ground bone; egg shells saved and fed to them mainly in the winter, when they often had warm food and warm water.

They are of mixed breeds, native, Poland and Shanghai combined. The last element diminished as much as possible of late.

The stock has been renewed every year at an unusual cost, in consequence of the necessity of cooping the breeding hens and the devastations of rats, hawks and neighbors' cats upon the unprotected chickens.

The hens have been set in a small place apart from the laying hens and have not hatched very successfully.

The hatching and rearing of poultry is much more profitable where the fowls can have the range of the barnyard and farm for the year (except in planting season). There is no difficulty in making hens lay in winter provided you have a stock of spring pullets well housed and fed;—the more animal food the more eggs,—access to gravel, lime in some form, and water

slightly warm. Lime water has been frequently recommended to make hens lay; but so far as my experience goes they will not drink it if they can get pure water.

Wash the roosts and nests in whale oil soap and an infusion of tobacco, or in spirits of turpentine, to destroy vermin.

Set hens in March and April. After the 10th of May they will not do so well where you keep many hens cooped up. On a farm it is not of so much consequence. But the earliest chickens are the most valuable for market and for winter layers. The specimens presented for exhibition are those most esteemed by the subscriber; two old hens, partly Poland, as indicated by the tuft, partly native, with some Shanghai. Also a spring crower of the same breed and a similar pullet with no tuft.

FRAMINGHAM, September 20, 1858.

Statement of F. C. Browne.

I offer for your inspection a coop of my Bolton Grey fowls, of this year's hatching. I have kept this variety for several years, and find them excellent layers. The eggs of the *pure* Bolton Greys are however rather small for market, and I prefer to have them crossed to some extent. The Black Spanish Dorking, or any of the large China fowls make a good cross. Perhaps the best of all is that with the medium sized short-legged Cochin Chinas. Also, if you wish to raise chickens, you must cross, or else keep a few hens of other breeds, for the Greys rarely incline to set. For myself I like that peculiarity, for I am satisfied that at the prices of the last few years it pays better to raise eggs than chickens.

I cannot present a very regular balance sheet with regard to these fowls, but the following is a tolerably correct estimate for six months of the past season.

Stock averaged 20 hens and pullets; about two-thirds Boltons, more or less pure; balance of various breeds. They were kept principally on corn and oats, with an occasional feed of boiled potatoes, a little meat or fish once a week or so, and old mortar and oyster shells constantly by them. The supply of animal food I consider indispensable, if the fowls are restrained of their liberty to any extent. It will increase the yield of eggs 50 per cent.

The pullets commenced laying February 1st, the hens soon following suit. In the six months ensuing, I sold from them 94 dozen of eggs, at an average of 15 cents,=$14.10. I also raised 60 chickens, worth on an average, 30 cents each. The present value of these, (cost of raising deducted,) plus the value of eggs used in the family, I think a fair offset to the expense of keeping the fowls; which would leave the above sum received for eggs, about $14 as the profit from 20 fowls in six months.

I have never been able to reach the large profits of newspaper accounts; partly, perhaps, from being obliged to keep my hens shut up most of the time, on account of the mischief they do in the garden, and partly from not being able to attend to their wants so closely as might be desirable. The above, however, shows I think, a reasonable return for time and cash invested.

FRAMINGHAM, September 21, 1858.

WORCESTER NORTH.

From the Report of the Committee.

The raising of poultry is unquestionably profitable, the returns being speedy, sure and large, in proportion to the capital invested; and were it not for the somewhat too common tendency to regard it as "rather small business"—as "well enough to keep a few hens; convenient, perhaps; don't amount to much either way," &c. &c., this fact might have become more apparent. Two things may be observed in this connection; first, that no business can properly be considered small, that pays a good per cent. on the capital; and secondly, waiving even this, and granting, that, as often conducted on a diminutive scale, the receipts are small, the net profit small, and the business small, still the trouble and outlay are also small, and if it is really too Liliputian to be reputable, why not make it better worth attention, by increasing and extending it. It may be thought hardly worth while to keep a hen a year, and only get a dollar for her services; but a thousand hens yielding a thousand dollars net profit, sounds differently. We have no room, in a report, necessarily brief, to go into detail in this matter, but we have carefully investigated the subject, and can give what is, after all, the only thing possessing interest,

namely "a result." We have taken indiscriminately the statements (found among the reports of different agricultural societies in past years) of nine individuals in different portions of the State, and give below the aggregate. Commencing the year with about eight hundred hens, the expenses of keeping amounted to $732.28, (reckoning from the preceding autumn, and including of course the expense of wintering,) and the receipts, including chickens and eggs sold, consumed, and on hand, (making allowance from the stock on hand, to make it fully equal to the number with which they started,) to over $1,410.16, showing a profit, clear above expenses of $677.88. In seven of these cases, no mention was made of manure or feathers. In the other two they were not included in the receipts. The receipts too, were unquestionably smaller than they would be in our immediate neighborhood; the prices, so far as quoted, being considerably less than we are accustomed to. Assuming that the manure and feathers were not included, (which from the wording of the statements we feel fully justified in doing,) and adding to the receipts sufficient to make up the difference between our prices, and the general average, (much reduced by the prices in districts not so closely connected with large consuming and non-producing centres as we are,) and the profit would be increased so as to fully equal one dollar per head of the original stock, and net over one hundred per cent. upon the outlay. What, that the farmer raises or keeps, or produces, will excel this?

As to the varieties and breeds, we do not propose to enter the lists at all, or undertake to show which is the best, or why we think so. Truly "their name is legion," and each finds able defenders, hardly any two of whom agree. One wants eggs, another roast chicken, another fine color, another size, &c. &c., and we sincerely pity the man who undertakes to secure a place in an insane hospital, by trying to maintain and defend an opinion that any one kind is better than another. If ever the celebrated "Old Grimes" breed is heard of (except in song) which it will be recollected laid two eggs a day ordinarily, and as a special act of piety signalized the Sabbath by laying three, we will enlist as its defender. Meanwhile experience will soon satisfy each one which will answer his particular purpose best.

We have confined our remarks more particularly to common barnyard fowls, not from any particular preference, but from the necessity of drawing the line somewhere, and having continually before us the dread of making our report too lengthy. A recent writer in the *Country Gentleman* says he raised from six hens and one cock, ninety young turkeys, worth one hundred and fifty dollars. The expense he does not speak of, but it could not have been very great, as they took care of themselves after four weeks; and did space allow, as good a word might be spoken for any and all of the poultry kind.

Here, then, gentlemen, is a fair field. If, as many complain, it be true that corn and wheat can be purchased cheaper than it can be raised; if, by the system of railway communication the great West, with its cheap, rich lands is brought too near for successful competition, in those great staples, try something else that will pay, and instead of being obliged to import, let us export from Worcester North thousands of dozens of eggs and tons of poultry.

George E. Towne, *Chairman.*

PRODUCTS OF THE DAIRY.

ESSEX.

Statement of Harriet D. Sawyer.

Cheese.—I enter for premium four new milk cheeses, weighing fifty-three pounds. Each cheese contains the milk of two days. The evening milk is strained into a tub and rennet added immediately. The rennet should be of sufficient strength to form the curd in thirty minutes, and should not be broken up under one hour or more. After being carefully broken, it is dipped off and left to drain until morning. The same process is repeated with the morning's milk. After that is broken the evening's curd is skimmed into it. The whole is then scalded with whey dipped from it, then thoroughly drain, chop fine, salt, and press twenty-four hours. Salt with Liverpool salt, one table-spoonful to a pail of milk. The cheeses are then dried in a dark room, turned and rubbed daily. Late in

the fall they are removed to a cool cellar, packed in straw and occasionally rubbed and repacked. Two of these cheeses are sage. The night previous to making them I pound the sage and soak it in milk until morning. I then strain the liquor into the milk just before I put the rennet in. I use my own judgment as to quantity, varying it as to the size of the cheese.

WEST NEWBURY, September 28, 1858.

MIDDLESEX NORTH.

From the Report of the Committee.

BUTTER.—As butter is an article of daily use in every family, it is important to ascertain the best mode of manufacture, which can only be done by comparing the different statements of the manufacturers.

We think the first requisite should be a good cow; second, a good pasture, and third, a good dairy-woman. We wonder that farmers are not more particular in selecting good cows, as it costs no more to keep a good cow than a poor one. There is no department of husbandry which might be more improved than the dairy. There is a large quantity of poor butter in market, which might as well be of first quality if proper pains were taken. Pastures are too much neglected. The butter made of poor materials cannot be of fine flavor. As to the management of the cream, it is not so necessary that it be kept sweet, though that might be preferable, but not always possible with a dairy of one or two cows. In no case should the hand be applied to the butter, as that gives it an oily appearance. Some consider the use of cold water essential in cleansing the butter from particles of sour milk, but we think it might be done without the aid of water, and the butter would be much sweeter and nicer.

DAVID P. LAWRENCE, *Chairman.*

MIDDLESEX SOUTH.

From the Report of the Committee.

In this age of improvement, when so much is said and written on the subject, it can hardly be expected that much will be said which is new to the farmer, or to the good dairy-woman who acts so important a part in the manufacture of butter. Yet a

few suggestions may serve at least to keep the subject before the mind.

In the first place, the farmer who would manage his dairy with the intention of making the greatest profit from it, should be very particular in the selection of his cows, as some cows may yield a great quantity of milk, and still make less butter and of poorer quality, than others that yield less milk, but of a quality much better for butter. The food of cows when making butter, has very much to do with the quality and quantity of butter made. Bushes and wild grass make poor butter. Upland pastures are to be preferred for a dairy. Cows should have access to plenty of pure water and salt. There should be a regular time of milking, and cows should be milked from day to day, by the same person. Milk should be strained into pans in very small quantities, as that conduces much to the shortness of time in gathering the cream, which is very essential. The cellar or dairy room should be kept clean and well ventilated. A dry cellar is to be preferred to one that is damp. Milk should not be allowed to sour before removing the cream, as cream taken from sour milk will not make sweet butter. Cream should be kept in a cool place, and stirred often, as mould is very liable to collect on it if this is not done, and when this is the case the butter will not be so good. It is very necessary that the cream should be of the right temperature when put in the churn,—say about 58° Fah. in summer and 62° in winter,—that the butter may be in a suitable state to be well worked when taken from the churn. It should then be salted and kept in a cool place from twelve to twenty-four hours; then it should be thoroughly worked and prepared for the table. It is a fact well known to all dealers in table butter, that much of the butter exposed for sale in the market, is injured very much by containing too great a quantity of salt, and will not sell so high as butter that is fresher. The objection is often made to this plan, that butter will not keep unless it is made very salt, and it is not uncommon to find butter in which the salt is much more plainly tasted than the butter. Butter which has the watery particles thoroughly worked out of it, can be preserved for a long time with very little well pulverized salt, and it is such butter which commands the highest price.

In conclusion, a well managed dairy is one of the greatest sources of profit to the farmer; and whoever succeeds in producing a superior article of butter, will have the approbation of all lovers of this great luxury.

J. C. Howe.

WORCESTER.

From the Report of the Committee.

It is only necessary to remark, that the reputation of Worcester county, for butter, cannot long be maintained, unless the farmers' wives and daughters will bestow upon this rich product of their dairies more labor and care. Not one of the twenty-one lots of recently made butter had received sufficient care and labor to thoroughly separate the buttermilk from the butter. Neither had that nicety of judgment and discretion been bestowed upon it in salting, which is necessary to make it what it should always be, a luxury. The June made butter, in the opinion of the committee, was all rancid.

It is a mistaken notion that salt will preserve butter, and that as it is wrought less, it should be salted more. Under ordinary circumstances, butter will keep sweet longest in its free and pure state, and the great secret of butter making lies in separating and keeping from the butter all extraneous matters. Work the butter with clean and cool hands until the buttermilk is thoroughly and entirely separated from it. Salt the butter only to the taste.

The prominent defects, only, of the butter entered for premium have been noticed and the remedy hinted at. Much might and should be said of the various methods of preserving milk, and of making, putting down, and keeping butter. Let it suffice, however, to say, that the farmer's wife or daughter who will next year offer for premium a lot of sweet, thoroughly worked, unsalted butter, or salted only to the taste, will doubtless receive the award, and will also deserve and receive the thanks of every member of the Worcester Agricultural Society.

Merrick Bemis, *Chairman.*

WORCESTER NORTH.

From the Report of the Committee.

It was the butter, which brought forth the applause of the committee, and which tried their tastes and judgments to the utmost, looking so rich, clean and golden, and at the same time tasting and smelling so sweet and rich. No article of the kind could be produced which could reflect more credit upon the producers, and at the same time so try the judgment, taste and conscience of a committee, by its similarity of excellence, as the numerous samples produced at the show of Worcester North. As all the statements of the various makers did not come into our hands, we cannot judge of methods pursued, but must suppose from the facts produced, that they all practiced the very best now known. It is truly most encouraging to witness the great improvement in this branch of husbandry, and we wish all would furnish themselves with one of Mr. Flint's books on dairy matters, in order that they may learn to make more profit from their labors, if they cannot produce a better article.

The samples of cheese were not numerous, there being only three, and all from one dairy; and although not esteemed the very best, they were pronounced good, and the wish was uttered that much more of like quality might be produced in the north part of Worcester county.

EZRA KENDALL, *Chairman.*

Statement of S. M. Caswell.

BUTTER.—The process by which our butter is made, is very plain and simple. The milk is strained into tin pans, filling them about half full. When the weather is cool the pans are set in a milk-room, on racks instead of shelves; when it is warm they are set in the cellar on the ground, where it usually remains from thirty-six to forty-eight hours, according to the temperature of the weather, especial care being taken not to have the cream remain on the milk after it begins to sour. When the cream is taken off it is put in tin pails, and kept in the cellar when the weather is warm, being frequently well stirred, until it is churned, which is usually once in two or

three days. After it is churned and the buttermilk is worked out, it is salted with about one ounce of salt to a pound of butter. It is then set in the cellar where it remains until the next day, when it is again well worked over and lumped for the market.

Statement of Franklin Nourse.

BUTTER.—I offer for premium one box of September butter, twenty-two pounds.

The process of making is as follows: After the milk is drawn from the cow, it is strained into tin pans and set in a well ventilated milk-room—nothing else being allowed in it—upon slats one foot apart, instead of board shelves. After setting about thirty-six hours—varying according to temperature—the cream is taken off and put into stone pots, and stirred once a day. I churn with a rotary churn once a week; after which, the butter is taken out, worked and salted with one ounce to the pound, and lumped the following day. At the last working is added two ounces of sugar to twelve pounds of butter.

FRUITS AND FLOWERS.

ESSEX.

From the Report of the Committee on Fruits.

PEARS.—The pear tree is said to be a longer lived tree than the apple. Notwithstanding this, most of our newly introduced fruits show symptoms of decay, while many of the old varieties which are scattered here and there throughout New England are still in a bearing and healthy state. If it is admitted that the natural life of this tree is from fifty to one hundred years, it becomes of the highest importance to ascertain, if possible, the causes of this premature decay. The old pear trees alluded to, as far as we can ascertain, are growing upon the spot where they came up from seed, or transplanted when young with their tap root uninjured. Our cultivators at the present time invariably cut off the tap root, in order that lateral roots may multiply and the trees grow faster and more vigorously, as they

unquestionably do for a time, but not, we apprehend, for permanency. In nature, there is an equilibrium between the roots and tops of all trees, and by cutting off the tap root, we interfere with its healthy action by producing a forced growth, and a sort of plethora, which may tend to produce disease, although it may hasten its bearing. Another cause for this decay may be from the practice of Van Mons; many of our new varieties originally came from him, the leading feature of whose theory was to subdue or enfeeble the original coarse luxuriousness of the tree, gathering his fruit from which he took his seed before fully ripe, and allowing the fruit to rot; he cut off the tap root, and annually shortened the leading and side branches, besides planting his trees very near together. Duhamel, of France, it is said, was in the habit of planting seed from the finest table pears of his day, for many years, without producing one good variety. Van Mons, on the contrary, by the enfeebling process, has produced more than a score of fine varieties. May this not possibly be another cause for the appearance of many trees upon which his varieties are grown? The healthiest pear trees we have recently seen were upon the farm of General Newhall, at Lynnfield. These were grown from seed sown some years since, were remarkably thrifty, and much larger than any we have ever seen at that age from the seed. A few of them were in flower; and these trees had not been pruned in root or side branches, their side branches protecting the trunk from the scorching rays of an August sun. We apprehend that it will be found, sooner or later, that this cutting off the tap root and pruning the side limbs of our trees when young, is a bad practice. An Illinois cultivator has said that the "effects of pruning the trunks of young trees severely, results from disturbing the natural relation of the ascending and descending sap; he allows the shoots on the trunks to grow on, and that in two years they covered them to the ground; his trees then started with a vigorous growth throughout the whole top, and are now loaded with fruit, while a neighbor who continued the practice of trimming the bodies of his trees lost every one by what he called pear blight."

Trees of the apple and pear are subject to a sort of dry canker or desiccation of the bark, which is said by Bravey, of France, as by many of our cultivators, to be caused by the too

powerful rays of a burning sun occurring immediately after a shower, striking the branches still wet, often producing in young trees this desiccation of the bark. In proof of this we find these appearances generally on the south side of the stem, more especially on the south-south-west side, or towards the two o'clock sun. The means of protecting the trees, adopted by Downing, was to white-wash the trunk in spring; we find, however, a wisp of straw matting or sea-weed to answer the purpose, covering the trunk quite up to, or upon the lower limbs. Although the pear tree generally requires a retentive soil, in order to give good returns, a swampy or wet land, or where water stands under the surface, (or subsoil,) is an unsuitable location for this tree; in such a place it may be necessary to take off the tap root, that the upper lateral roots may be kept near the surface. If the roots of any fruit tree enter and remain in a swampy or wet soil, such roots will decay and a corresponding decay—sometimes called canker—will be seen commencing in the top limbs.

Grapes—Importance of Leaves. There are many varieties of native grapes which have been from time to time recommended for culture; among them (as a wine grape) stands the Catawba, which is rather extensively grown at the West for this purpose. As this grape is later than the Isabella, it is not much cultivated in New England, for the only difficulty we find in the Isabella is in its uncertainty of ripening. The great desideratum at present, is to obtain a grape of as good quality which will ripen some three or four weeks earlier. As to the flavor, as well as the bearing quality of this fruit, nothing could be wished for better than we have seen it in New Jersey and Pennsylvania. Numerous seedlings of this and other native grapes have been produced, varying but little from their original except in form; seedlings of the Isabella which we have seen have been almost invariably rounder, or not so oblong. The Concord, Millard, Clinton, Diana, Hartford Prolific, are neither of them much earlier than the Isabella; the last named one may be considered from ten to twelve days earlier, as also the Concord and Diana. The Isabella grape may be accelerated in ripening, and produce larger berries by a process of ringing the shoots from the 15th to the 25th of July, upon

the last year's wood, but upon the new wood this may be done from the 25th of July to the 10th of August. Vines treated in this manner produce fruit nearly twice its usual size, when girdled nearly or quite an inch in width. The shoot thus operated upon dies, of course, the following winter. But where a ring is taken of only one-half an inch, the fruit grows larger; but the bark coming together before the winter, a connection is made, and the shoots are seemingly not injured. This process was recommended by President Knight of the London Horticultural Society, in 1823. We have practiced it for five years, producing bunches of nearly one pound in weight.

This theory clearly shows the folly of cutting off leaves under the mistaken notion of admitting light to the fruit, and denuding the vines almost entirely, as some ignorant persons do with grapes and melons. In plants the leaves act as lungs in animals. McIntosh says, "that the preservation of the leaves on vines, as indeed of all other trees and plants, is of vast importance—indeed so much so that the removal of a single leaf tends to lessen the vigor and energy of the tree." The practice of cutting off the tops of corn stalks as soon as the grain is glazed is still followed notwithstanding the loss of weight in the grain being more than the value of the stalks. If vegetable physiology was more generally understood and believed, that the leaves performed the same part in plants as the lungs or stomach in animals, by exposing the crude sap to the atmosphere, parting with oxygen, and secreting carbon, returning the fluid back to the whole system of the plant, the reason why the tops of corn stalks are, and must be useful in ripening the seeds, would be understood. The wood and fruit of trees and vegetables are matured by the returning sap after it is elaborated by the leaves. If it is not so, how is it, that when a variety of fruit is ingrafted upon a wilding, it will produce fruit like the tree from which the scion was taken, and never from the stock on which it is worked? Mr. Knight maintains that the sap of trees ascends in the alburnum or sap-wood, where it makes its first deposit of new wood. This theory led to many experiments. Mr. Williams applied it to the early maturation or ripening of grapes; he found by taking off one-quarter of an inch of the bark in width, that the sap was

impeded in its descent, the parts above became larger, the fruits swelled and ripened earlier. This corresponds with our own experience.

This process may be applied to other fruits, the effect of detaining the sap unnaturally in the branches being to force the plants to produce blossom buds instead of leaf or branch buds. It was before known that any thing which checked the growth of a fruit tree hastened the production of fruit; it was, however, reserved for Mr. Knight to show the causes, and to submit the whole process to rules as certain as are known in any other branch of natural science. The late Mr. Lowell, of Roxbury, tried this plan on twenty young pear trees, which had been grafted from ten to twelve years without giving fruit. The branches thus operated upon bore full fruit, while every other branch was barren and unprolific. On some trees he girdled one, and on others two to five branches. He found equal success on plums. Mr. Knight, from whose theory the experiments have been derived, thinks it will shorten the longevity of trees subjected to it. Mr. Lowell, on the contrary, did not apprehend this. He thought that judicious girdling was nearly the same with grafting; that produces a similar interruption of the sap; a callous is formed between the original stock and the graft, and yet we see the branches continue productive and enjoy excellent health.

The Isabella vine suffers more or less every winter. Long shoots of the previous year, and occasionally the whole vine, is what is called winter-killed. Many attribute this to extreme cold. We apprehend that it is invariably produced by the warm days of that season. In this our variable climate at night we have the thermometer at zero, followed the next day by a bright sun with the warmth of spring. Any one may satisfy himself of this who has two vines trained upon a wall or building, exposed to the sun in winter. If he will but take one of these down, and lay it along its whole length upon the ground, he will ordinarily find the one left up through the winter filled with dead wood, while that upon the ground is uninjured. This does not apply to those grown upon an open trellis, where the air circulates freely. Now if the sap of trees, particularly the grape, is "always in motion, at all seasons, and under all circumstances, except in the presence of intense cold,"

as said by Dr. Lindley, can we wonder at these results? "If sap," says the same, (and no better authority can we have,) "ever settles to the roots in a visible form, that is owing to temporary causes, the removal of which occasions its instant re-ascent." That it is the sun in warm days in winter which affects the new growth, is shown by the fact that the morus multicaulis and other half-hardy shrubs and trees, winter better upon the north side of hills rather than the south. "If you are planting fruit trees," says an "old digger," "don't be so foolish as to set tender trees, such as apricots, in warm, sunny places, on the south side of walls, fences and gardens; such are, depend upon it, the very spots to kill them—between the extra heat of midsummer and that constant freezing and thawing of the trunks in winter, you had better choose a west, even a northern exposure, the latter is much the better in the middle States."

The summer pruning of the Isabella recommended by Downing in his book of Fruits, and which we, in common with him, practiced for many years (which was to cut off every shoot two or three joints beyond the outer branch of grapes,) we now believe to be wrong. All the summer pruning which we now give the vines, is to cut off the laterals that spring out of the new growth at the base of the leaves near the fruit bud for the following year to within one joint, leaving one bud to prevent the fruit bud from pushing. Dr. Lindley came out with a paper containing the following excellent propositions, which convinced us of our error:—

"1. If all the leaves which a tree will naturally form are exposed to favorable influences, and receive the light of a brilliant sun, all the fruit which such a plant may produce will ripen perfectly in a summer that is long enough.

"2. If all the leaves of a tree are exposed to such influences, all its fruit will advance as far towards ripening as the length of the summer will admit of; it may be sour and colorless, but that condition will be perfect of its kind.

"3. But if all the fruit which a healthy tree will show is allowed to set, and a large part of the leaves is abstracted, such fruit, be the summer what it may, will never ripen.

"4. Therefore, if a necessity exists for taking off a part of the leaves of a tree, a part of its fruit should also be destroyed.

"5. But although a tree may be able to ripen all the fruit which it shows, yet such fruit will never be so large nor so sweet, under equal circumstances, as if a part of it is removed, because a tree only forms a certain amount of secretions, and if those secretions are divided among twenty fruits instead of ten, each fruit will in the former case have but half the amount of nutrition which it would have received in the latter case.

"6. The period of ripening in fruit will be accelerated by an abundance of foliage, and retarded by a scanty foliage."

"It is a mistake to imagine that the sun must shine on the bunches of grapes in order to ripen them. Nature intended no such thing; on the contrary, it is evident that vines naturally bear their fruit in such a way as to screen it from the sun, and man is most unwise when he rashly interferes with this intention; what is wanted is the full exposure of the leaves to the sun; they will prepare the nutriment of the grape—they will feed it and nurse it, and eventually rear it up into succulence and lusciousness."

If in early winter or spring too much wood has been left upon the vines, and too many shoots have been suffered to grow, these may be cut out in July close down to the point from whence they start, taking off the whole branch, fruit and leaves. When the branches in autumn are beginning to slacken in their power of lengthening, it is then right to stop the shoots by pinching off their ends, because according to Lindley, newly formed leaves late in autumn "have little time to do more than organize themselves, which must take place at the expense of matter forming in the other leaves."

Pruning.—We find that the best time to prune the Isabella grape is immediately upon the fall of the leaves in autumn.

Autumn stopping of the vine shoots is therefore not only unobjectionable but advantageous; for the leaves that remain after that operation will then direct all their energy to the perfection of the grapes. We have abandoned the old practice of

summer shortening, and from some years' experience are perfectly satisfied that we have larger and better ripened fruit.

Thinning the Fruit.—The Isabella vine, when in a vigorous state, frequently shows double the number of bunches it is able to ripen in perfection without weakening and lessening the crop in succeeding years; two bunches upon a strong shoot, and but one on a weaker, should remain. The outer bunch or bunches should be taken off. You will by this method obtain larger fruit on those left. Bleeding of the vine in spring is often a source of much anxiety; we have never as yet noticed any bad effects resulting from this bleeding of the laterals, either in the growth of the vine or crop of fruit.

On a visit to Vermont, a few years since, in midsummer, we examined some twenty sugar maple trees, part of them having been tapped in March of that year. We could not see a particle of difference in the length of growth between those from which sap had been extracted and the others. Since that time we met with the remark of the celebrated Duhamel, who says: "This bleeding of the laterals in the grape vine does not seemingly injure the growth or crop of fruit."

J. M. Ives, *Chairman.*

From the Report of the Committee on Flowers.

So far as the cultivation of flowers is concerned, there has been in our day, a vast improvement, both in variety and magnificence, over those cultivated a generation ago. All parts of the world have been explored to add new attractions to the green-house and flower border, where we have an example of universal brotherhood assembled from every nation under the heaven, the like whereof is unknown to humanity. In this desire for new and ever varying forms, are we not in danger of becoming altogether too fickle and wavering in our taste? True taste lies in a keen perception of nature. A flower should be esteemed less for its rarity than for its intrinsic beauty.

> "Beauty is truth, truth beauty, that is all
> Ye know on earth, and all ye need to know."

A beautiful thing is forever a beautiful thing, and in no wise subject to fashion or caprice. We like occasionally to renew

acquaintance with the old flowers, (we will not call them old *fashioned* flowers,) that our grandmothers used to cultivate; most of them were truly beautiful, notwithstanding our long familiarity with them. The lilacs, hollyhocks, lupins, daffodils, poppies, four-o'clocks, marigolds, and morning glorys that once adorned the garden-walks of the old mansions, are capable of great improvement. We are indebted to the bouquet from Middleton for some of these suggestions that seem to cluster round its central branch of hollyhocks. The hollyhock is susceptible of great variety; it belongs to a family of plants altogether too much neglected; when the plants are not grown thickly they are of good form, and although the flowers cannot well be plucked upon stems, they still make a fine show when placed in shallow dishes of water. A bunch of lilacs revives the memories of youth, and we never suffer "'lection week" to pass without plucking at least one thyrsus, and enjoying its fragrance. How refreshing are the reflections which we derive from youth and spring time, when the "maple bursts into a flush of scarlet flowers," and the columbines and anemones peep from the springing grass or crest the mossy rocks.

> "It is like a beguiling music,
> And we wonder not that we loved, as now,
> To hunt for violets in the April time."

Have we not in flowers that bloom in every clime and toss their fragrance into every dwelling place of humanity, an evidence of their great Author's love of beauty, and thereby authority for the embellishments of life. And we should ever learn to add grace to mere utility, by throwing over all our inventions the lighter robe of beauty, as expressed in form and color.

Flowers never seem out of place; they attend the checkered path of life, from the cradle to the grave, and at all times reflect the sympathies of man. They are present at our festivities, welcome at our solemnities, and inspire hope and comfort in the hours of sorrow and distress. We do well to learn

> "How with tree and flower,
> In converse sweet to pass the hour
> As with an early friend."

No other simply beautiful thing is endowed with such a breadth of sentiment; the plumage of birds is beautiful, and their songs delightful, but neither of them could find a place in the heart of the mourner, and at other times they might produce satiety and weariness. Even the few superstitions that are attached to flowers are some of them very beautiful:

> " I would give you some violets,
> But they withered all when my father died."

Again, how flowers are inwrought into all the arts and embellishments of life, from the lofty architectural ornament to the sprig on a youth's vest. Many persons who have neither the taste or inclination to cultivate flowers, surround themselves with representations of them, upon their carpets, tapestry, clothing and ornaments. The story of flowers and their effect upon the heart and the well being of man has not been half told.

The memory of some men is intimately attached to particular flowers. Some are called after their names, while others more directly appeal to our sympathies. Who is not reminded of the lamented Kane when he sees the vernal Saxifrage cresting the mossy rocks in early spring; this little flower or a species scarcely dissimilar, was one of the last flowers to quit the Arctic voyager's weary track. Or who can gaze upon the brilliant Escholtzia without thinking of the melancholy fate of Douglass, the botanist, goaded to death by wild buffaloes in a strange land? And while those recent and hardy additions to the shrubbery and garden, the Wigelia and Dieletra spectabilis shall be cultivated, the name of Mr. Fortune, who introduced them from China, shall not be forgotten.

Ever present flowers, to what a noble ancestry do they belong! Whose hands have not plucked them, and whose gaze have they not reflected? Wise and holy men have drawn from them inspiration and inculcated moral lessons. Kings and magnates of the earth have regarded them, and been honored by their presence. Poets of all time have wreathed their harps with them and sang to their praise. Unquarried rocks and beds of fossil coal, deep in the bowels of the earth,

hold in their crystalline embrace the flora of an antedeluvian world.

> " O, there is not lost
> One of earth's charms; upon her bosom yet
> After the flight of untold centuries,
> The freshness of her far beginning lies
> And yet shall lie."

But to become more practical; in this desire for variety above alluded to, which is certainly most praiseworthy and should be gratified, why do not florists as well as botanists oftener draw forth from their quiet retreats in the coppice and meadow, the beautiful and fragrant plants (not a few) from among our native wildlings, that they, in their simple purity, might adorn our borders and mingle their sweets with the pampered and often deformed aliens that usurp the entire dominion of the flower garden; which exotic plantsa not great while since, in simpler garb, embellished the wilds of other lands, where they were originally native?

What shrub can be found more fragrant than our Elethra, or more beautiful than our Laurel? What plant more curious than the Side-saddle flower? and the whole world of flowers may be "challenged to excel the intense red of the Lobelia cardinalis." American plants are greatly esteemed abroad; that section of the English gentlemen's grounds designated the "American Garden," and which contains our Magnolias, Kalmias, Azalias, and smaller plants, is one of the chief attractions of those often extensive domains.

What a field is opened here, also, for ingenious fancy and scientific acumen, in the crossing of our wild plants with kindred species among the exotics of the garden, the unions whereof would undoubtedly result in the production of hybrids of new and singular forms, that no eye has yet beheld, thereby rewarding the skill and ingenuity of man, with the gift of new creations. To persons at all intimate with our native flora, numerous alliances will readily suggest themselves as among the probabilities of success.

We need not go out of our native county for novelties or magnificence in this department. Flora has honored Essex County above many a milder region that lies between us and

the Middle States, in the Magnolia, that with such prodigality scatters its fragrance throughout the swamps of Essex and Gloucester. Danvers, too, is noted among botanists, for localities of the Cowberry* and the little Draba verna.

> "The first gilt thing,
> That wears the trembling breath of spring."

Neither are we at all behind other sections of the country in men of zeal and attainment, who possess the keenest perceptions of nature's charms. The learned and venerable Cutler, the genial Nichols, and the devoted Oakes, have left the savor of their names behind them, and now lie where the trefoil dallies with the breeze and scatters far and wide its perfume. The living are, in one way and another, telling their own story. To a son of Essex belongs the honor, in which few have ever shared, of rearing, from seed to adult and regal splendor, the Victoria regia, and of adding a magnificent volume upon that subject, to the botanical lore of the country. Others have done much to introduce and propagate new and rare plants, or otherwise to disseminate a taste for gardening and the study of botany, and in this connection it may not be amiss to mention the great success that has attended the field meetings of the Essex Institute, in diffusing a taste for botanical and kindred pursuits in a manner worthy of imitation in other counties.

The embellishment of our cemeteries not only with deciduous and evergreen trees, but with shrubs and flowering plants, is a delightful feature, and one which marks the times in which we live. The freshness and bloom that now surround the habitations of the departed, rob the grave of much of its gloom, and bespeak of peace and immortality beyond.

However we may regard them, flowers will never cease to be admired. Seals are they of Divine stamping; "the finger of God is upon them all." Every thing that waves in the breeze, or pays the tribute of its bloom to the sun, is worthy of our love, particularly the tall old trees that have for generations shaded our ancestral homes, and the shrubs that border our native hills, and the plants that spring around the thresholds of

* Vaccinium vitis-idœa.

home; all who heed the still, small voice of their teachings shall lay up treasures of memory for the drafts of after years. They shall honor the father and mother that bore them, and the land that gave them inheritance. The auriferous sands of California shall not tempt them away from their farms and firesides, and the defence of all that New England holds dear. The commandment with promise shall be theirs, their heads shall bear the silvery crown—reward of years, and their children shall call them blessed, for without invidiousness they will undoubtedly have one "flower in the family," and when their eyes are dim with age, little children shall place the butter-cup to their chins to see if they still have a relish for dairy products, and a pansy slipped into their bosoms shall revive the sweetest memories of by-gone days. And when they die, as the lessons of nature and grace shall one day make them willing to, the near and dear shall place the sod over them, and the violet—emblem of virtues that still blossom in the dust—shall look heavenward from their graves to its kindred azure above; and the sun—parent of flowers, shall at morning and evening, daily and forever, gild the place of their sepulture in the land of their fathers.

George D. Phippen, *Chairman.*

HOUSATONIC.

From the Report of the Committee on Fruits.

The committee on fruits and horticulture, in presenting their report, cannot but express their satisfaction at the quality and variety of the products that fell under their department of inspection. Such a show has not delighted a committee-man's eye for three years. Apples—fall and winter—pears and quinces, were nobly represented; the increased varieties of grapes indicated a growing attention to the culture of that delightful fruit, most encouraging and gratifying; while the show of peaches, though small in variety, yet splendid and toothsome individually, put our fears at rest, at least for the present, that our recent tough winters had nearly effected the destruction of this precious delicacy. Plums alone were wanting to complete a picture of Berkshire fruit, capable of inspiring even a hypochondriac with paradisal dreams. We think that

something more than lateness of season prevented the exhibition of more than three or four varieties of plums.

Without unduly extending their report, your committee cannot express the many ideas naturally suggested in the discharge of the pleasant duty assigned them. They would merely volunteer a few remarks—or, omitting the body of the sermon, give only the application. And firstly, they would say—protect, personally, and by the enforcement of law, the birds, which feed so largely upon insects injurious to fruit. And—says one of our number—" add toads also."

It is worthy of remark, that the fewer ravages of vermin on shade and fruit trees, the past season, are simultaneous with the presence of birds more numerously than have been known for many years.

Item. It is respectfully submitted, that only a single specimen of any variety of common fruit is hardly a fair representation, either for the offerer or the thing offered.

Item. Please don't dub seedlings with some eminent name to provoke the merriment of a sober committee. Unless certain of the right title, better say, " name unknown."

Item. Pains taken in the proper arrangement of specimens, are never lost. A jumble is never so effective as a distinct and conspicuous display. And for this end it seemed to your committee, that more show-cases for fruit were needed; some of the exhibitors to-day, having been compelled to resort to side-tables and an immediate removal after inspection.

Item. Your committee hope that the cultivation of the grape, so auspiciously inaugurated in our county, will be prosecuted, until good wine shall, as it can be, a product of Old Berkshire.

Item. Your committee found on exhibition to-day, several seedlings of the apple, which they judged worthy of enlarged cultivation. The temptation was strong to make some new names for the Pomological Society.

E. W. B. Canning, *Chairman.*

NORFOLK.

From the Report of the Committee on Fruit.

The display of fruit is, to many persons, the most attractive feature of our annual exhibition. The thrifty farmer sees in it,

at least an article of produce and sale—a source of revenue, and with the light of the knowledge imparted by physiology, he regards it as a most useful and necessary addition to his daily bread,—a partial substitute for the physician, and a relief to his pork barrel. The amateur horticulturist, with the curious eye of the connoisseur, inspects the fine specimens of new and rare, or perhaps older and more valuable varieties, and the lover of beauty gratifies his artistic feelings by admiring the fair proportions and rich colors of ruddy-cheeked apples, melting pears, luscious peaches and clustering grapes. For these, or other reasons, all persons are more or less interested in these productions of the garden and the orchard.

As an article of profit, we incline to think that the cultivation of fruit for the market is not sufficiently attended to in this vicinity. The love of fine fruit in our community is increasing. The better qualities are sought for, and the supply is unequal to the demand. Good fruit has an increasing market value, and a little extra care in gathering, assorting and packing, is sure to be well repaid in the additional price obtained.

It is not our purpose to attempt an essay on fruit cultivation, to give advice as to the best methods of planting and *feeding* fruit trees, or to speak of the many obstacles in the way of success. There are well written treatises, accessible to every one, that contain the combined knowledge of many careful, thoughtful and practical men. There is hardly any serious difficulty that may not be overcome;—there is but one subtle enemy that we are unable to conquer. Whoever shall discover and make known a simple and efficient check to the destruction caused by this insignificant looking beetle, but most dangerous enemy,—the *curculio*,—will do more than we can express, to encourage fruit growers and advance the progress of horticulture. At present, this pest has nearly deprived us of our plums, and threatens to wrest from us our peaches, cherries, and even apples; while nectarines and apricots are now unheard of.

A plan for increasing the size and hastening the maturity of certain kinds of fruit, has been somewhat adopted and is worthy of mention. Messrs. G. & C. Craft, of Brookline, exhibited Isabella grapes treated in this manner, and grown in the open air, perfectly ripe, and of remarkable size and beauty. This fine grape does not ripen perfectly in this vicinity, unless the

season is unusually favorable, and consequently the plan in question, enabling us to grow the fruit to unusual size, and to anticipate by at least two weeks the time of ripening, deserves attention. The process consists in what is called "ringing the vine," which is, simply, removing from the bearing shoot below the fruit, and when the grapes are about half grown, a ring of bark, half an inch wide. By this means, the sap being interrupted in its descent, stimulates the ripening clusters, and forces them to increased and luxuriant growth and early maturity. This method might doubtless be applied to all kinds of fruit, but, involving as it does, at the end of the season, the loss of the shoot so treated, it will probably be advisable to adopt it only in the cultivation of the grape, or perhaps the grape and peach.

CHARLES A. HEWINS, *Chairman.*

MARKET DAYS.

MASSACHUSETTS.

PRIZE ESSAY ON FAIRS.

BY A. W. DODGE, OF HAMILTON.

In offering its prize for the best essay on the advantages to be derived from establishing regular fairs or market-days throughout the State, for the sale and exchange of agricultural products, it is presumed that the society did not mean to consider the question as settled in favor of such fairs; but wished rather to elicit inquiry into their merits as compared with the prevailing modes of disposing of the products of the farm; and if, upon a careful and candid consideration of the question, it should be found that there were sufficient and weighty reasons for the establishing of such fairs, that then some practical plan should be proposed for this purpose.

These fairs or market days, which in fact are nothing more than a periodical concourse of people at a stated place, for selling and buying agricultural commodities and for hiring laborers, have long been in successful operation in Great

Britain. To the farmers there, they are of great importance, constituting their chief, or perhaps their only opportunities of effecting profitable sales or purchases of stock. The different breeds of neat stock, of horses, of sheep and of swine, are exposed to sale, often in large numbers and of great excellence, at the local fairs in the quarter where they are raised ; and they attract to them dealers from a distance, with the certainty that they can find just the description of animals they are in want of. This, with the local attendance, usually insures a brisk business. And so great is the convenience of a market day considered to be to the neighborhood in which it is held, that new fairs are constantly springing up, the only limitation to their number being the amount of business which may be controlled by them.

Besides live stock, fruit, vegetables and grains, find purchasers at these fairs, and they are offered for sale either in bulk or by sample, the latter being the more usual way of disposing of large quantities of any commodity. Most of these fairs, too, have a well-known and specific character, and are noted, some for the superior quality of one kind of stock or of produce, and others for that of another kind. And they often receive their name from the predominant article exposed to sale ; as, for example, a fair at which large quantities of cherries are presented, is called the Cherry Fair, and one of which sheep is the characteristic feature is called a Sheep Fair.

But in this country, or at least in New England, we have nothing answering to these fairs or market days. The nearest approach to them are the cattle markets established in the immediate vicinity of our largest cities, and mainly for the supply of the meat for their consumption, as those held weekly at Brighton and Cambridge, in our own Commonwealth, and which are the only markets of any extent for the sale of live stock, within her borders. These, however, differ in some important particulars from the fairs proposed for consideration. They are exclusively for the sale and purchase of live stock, and that stock is mostly brought from a distance, sometimes even from the far West. They afford a good opportunity for farmers in the surrounding country to purchase such animals as they stand in need of, and they are resorted to very generally by them for this object. But they are not intended to encourage

the sale of stock by these farmers, for the very obvious reason that but little or no stock is raised by them. They are also very inconveniently located, being at one extremity of the State, and therefore can be attended by the larger part of the farming population only at great expense.

What, then, would be some of the benefits of regular fairs or market days, established throughout the State, for the sale and exchange of agricultural products—benefits that might reasonably be expected from them? In the first place, they would offer to every enterprising farmer in their neighborhood a home market, or a market near at hand and easy of access. Studded all over as Massachusetts is—especially on her eastern borders —with cities and large towns and manufacturing villages, it might be thought that the farmers are amply supplied with good markets and at their very doors. To some extent this is indeed true, but it is equally true that very many farmers—a majority perhaps—are obliged to travel eight or twelve miles and sometimes more, in order to reach their nearest market town. The loss of time in thus travelling to and from market, and the wear and tear of horse and vehicle, are no inconsiderable items of expense to the farmer who is placed in this unfavorable position in regard to markets. Suppose that he follows the market weekly for two-thirds of the year, there are then thirty-five days to be deducted from the working days of the year, and if in the fall he goes to market two or more times in a week, the number would be increased fully to fifty days, including the occasional days in winter devoted to this object.

But the establishing of regular market days in towns near to these farmers, would prevent very materially this heavy loss of time and the expense to which they are now subjected. If there were twelve such market days in a year, that is, monthly markets, where they would be sure of finding purchasers, they would save the difference between twelve and fifty days of time, which they then would have to spend on the farm in increasing its productions, besides making a corresponding saving in the service of horse and wagon. This saving to the farmer may perhaps be more sensibly measured and appreciated, by considering what has been so justly stated by Henry C. Cary, in the Plough, Loom and Anvil, for September, 1851, in respect of labor.

"The first of all the taxes to be paid by labor is that of transportation. It takes precedence even of the claims of government, for the man who has labor to sell or exchange *must* take it to the place at which it can be sold. If the market be so far distant that it will occupy so large a portion of his time in going to and returning from his work, as to leave him insufficient to purchase food enough to preserve life, he will perish of starvation. If it be somewhat less distant, he may obtain a small amount of food. If brought near, he may be well fed. Still nearer, he may be well fed and poorly clothed. Brought to his door, so as to make a market for all his time, he will be well fed, well clothed, well housed, and he will be able to feed, clothe, lodge, and educate his children."

What is here said of labor applies with equal force to the products of labor; the nearer the market the more perfect is the power to exchange them and the higher is their price. Trite as is Franklin's proverb, it is not the less true, that "time is money." And yet our New England farmers, trained as they are to habits of thrift and economy in other particulars, and certainly not wanting in any of the essential qualifications for trade, seem, too many of them, in this important matter of marketing their produce, to set scarcely any value at all upon time. But if their time be worth to them any thing at all, if it will yield any return when skilfully employed, it surely ought not to be thus misspent, not to say squandered in a reckless and shameful manner.

In the second place, market days, by bringing the purchaser to the producer, or rather by creating a half-way place and common ground of meeting for business, instead of the producer being obliged, as is now most frequently the case, to go to the purchaser with his commodities, would tend to make better prices and quicker and more certain sales of them. As at present managed, the farmer takes or sends to his nearest market town such things as he has to dispose of, and unless he has a regular set of customers, he may be put to much trouble and inconvenience to find a purchaser, and must then often sell to a disadvantage. If, on the other hand, there is collected a large number of buyers at a stated time and place, and there are assembled such products of the farm as all are desirous of purchasing, it is clear that there will be more or less competi-

tion, and that sales will be readily effected at remunerating prices.

The tendency of trade in this country is to centralization. The large manufacturers of cotton and woollen goods and of boots and shoes, instead of selling at their factories, have their places for making sales in the metropolis. And where the manufacturer and the salesman are united in the same person, it makes but little difference whether the factory and the shop are in one and the same place or at a distance from each other. But where the manufacturer sells his goods to the merchant, who buys to sell again,—as in the case with boots and shoes—then it makes oftentimes all the difference to the manufacturer, of a living profit by the sale of his goods, or no profit at all, whether the purchaser comes to the manufacturer, or the manufacturer goes to the purchaser. The Scripture adage—"It is naught says the buyer,"—will operate in the former case with unrestricted vigor, while in the latter it will fail of its object to depreciate the price of that which it is known is wanted by the purchaser.

In the third place, no small advantage would accrue to the farmer by the establishing of regular market days, from their tendency to equalize the prices of agricultural products. At present, prices are left to depend too much upon caprice and accident, and but little difference is made between different qualities of the same article. An inferior article often brings as much as, or more than, a superior one; so that the sale of agricultural products resembles more a lottery than a fair and equable traffic. "What luck to-day?" is the usual interrogatory put to the farmer on his return from market; meaning thereby not whether a sale was effected of his produce, but at what rates. And as a consequence of this uncertainty in prices, there is but little inducement to prepare for the market any commodity—such as butter or cheese—of a superior quality, when it is well understood that as a matter of dollars and cents, an inferior one, requiring less time and labor in its production, will pay much better. The advantage of an open market where products of a similar kind are exposed to sale side by side, is that a standard of prices is readily fixed, each takes its place according to its merit and commands the price to which it is

fairly entitled. And this advantage inures to the buyer as well as the seller, and gives character and stimulus to the market.

In the fourth place, in connection with this benefit and closely allied to it, is the healthy emulation which is excited by bringing different specimens of the same products into comparison with one another. Competition of the right kind at once springs up—a competition to excel in the quality of the article produced and not merely in the price obtained for it. The man who has been contented to produce an ordinary article, because he has generally obtained a good price for it, or because he has never seen any thing superior to it, is stimulated by the success of his neighbor, both as to the quality and price of his products, to produce a better; whilst the other, to maintain his advantage and to avoid the mortification of being surpassed by his competitor, increases his skill and pains-taking. It is thus that progress in all the arts is effected, and it is only thus that progress in the important art of agriculture is to be achieved.

Besides this beneficial result, these fairs would tend to diffuse information, just as our cattle shows do, by promoting intercourse between men engaged in a common pursuit, and bringing their minds into contact on subjects connected with it. Inquiry into the different processes by which results are obtained in the various branches of husbandry is thus excited, and the why and the wherefore of each are freely discussed. It cannot be otherwise than that the farmer must return from these fairs a wiser man, or if he thought that all wisdom would die with him, that this conceit must be rubbed out of him by the friction to which he has there been subjected. It often happens, for want of this intercourse among farmers, this interchange of opinions and mutual comparison of skill and intelligence, that individuals exhibit an overweening pride in respect of certain processes or products, which is not warranted by facts and is simply ridiculous. One of these self-sufficient farmers, who had always in his own estimation the best of every thing, was heard to utter the boast, when speaking of the prospects for a hay crop, "that he should have had the best in the county, if his hay-seed had only caught!"

There is no denying that as a class our farmers are *set* in their opinions, whether well or ill founded, and this arises as much from their living comparatively by themselves, as from

that independence of character which springs from their occupation. The commercial intercourse of these fairs would supply just what is wanting to many of our farmers; it would liberalize their views and enlarge the sphere of their observation, and as a necessary consequence agricultural knowledge would be advanced. Indeed these fairs would become a school for the young farmer, and for all farmers who were not too old to learn. The various breeds of stock could here be learned, their points noted, their peculiar marks of excellence ascertained, and a vast amount of experience and information in regard to them gained. Trained in such a school, our farmers would become much better judges than they now are, of farm stock. And will any one pretend that it is not vital to the interests of the farmer to be able to judge of a good cow or of a good pair of working cattle, so as to be seldom disappointed in making his purchases? Should he not here as in other transactions be able to think for himself, and if need be to give a reason for his opinion? Will he not at least have more self-respect and command better the respect of others, than by a blind and hap-hazard way of doing his business?

The farmer needs to be well versed in the knowledge of buying and selling, and this knowledge can be acquired only by observation and the exercise of his own faculties. Many farmers fail here. They raise good crops and they harvest them in good order; but when they come to dispose of them they are at fault; they are either too early or too late in making sales, and have usually the worst end of the bargain. Now why is this? Mainly for want of practical experience in trade. The narrow round of their customers gives no opportunity for them to learn, and they go through life with but little skill in this the financial department of husbandry. The establishing of market-days, by collecting large numbers of buyers at one place, and by the competition excited thereby, would give to the farmer more tact in trading than it is possible for him now to acquire.

In the last place, these market days or fairs would tend to concentrate New England farming upon fewer products, by making near and certain markets for them. As it is now, our farm products are too varied; we raise a little of every thing, and not enough of any one thing to make it profitable, from the expense of disposing of them. Of many articles raised on the

farm, the little surplus over what is wanted for home consumption is taken to market. As a consequence, sales are uncertain and the proceeds come in by driblets. And there is at present little inducement to go largely into any one production. But create a fixed market near at hand, and our farming would at once shape itself accordingly. One farmer would take to neat stock, another to sheep and another to pigs, and they would all aim to have the best breeds, and the best animals to take to the market. Quick sales, too, would be had for them, if it was known, as it would be, when and where they were to be offered for sale.. At the same market the farmer could buy what he is now forced to raise or to purchase at great disadvantage. The farmer who went into stock raising, would not be likely to raise all other farm products, as he could find them at hand, on market day, much cheaper. There would thus be a division of agricultural labor that would be for the common good. Few farmers in this State think of raising their own wheat, as they can buy flour much cheaper; and so it will be of many other farm products, when these markets are once established.

We have dwelt thus at length on the general advantages of regular fairs or market days, if established throughout the State; let us now consider some of the particular benefits to be derived from them. Every farmer wishes, more or less times in the year, to purchase live stock, either young animals to keep over winter, stores to fat, milch cows to recruit his dairy, or working oxen, or a bull, or a horse, or swine, sheep or poultry. Some of these are sure to be needed by him, and he must either ride round among the surrounding farmers, or he must go to Brighton or Cambridge, to make his purchases. The former course is attended with much loss of time and vast uncertainty of finding the precise animals wanted. The latter involves much expense, and the inconvenience of making the desired purchase at a distance from home, which distance must be travelled by the animals as well as himself, to reach home.

Now, if there were a cattle fair held monthly or quarter-yearly in his neighborhood, he might at a trifling expense resort to it with the certainty or high probability of making his purchases, and he can return with them the same day to his farm. Or suppose that he has an ox which he wishes to mate; he can drive him to the fair and he may there meet with another farmer

similarly situated, and thus the two are brought into a position to make some sort of a trade, which may be mutually advantageous. Now these men might have ridden about a week or more exploring barnyards and fields for an odd ox—and what farmer's experience does not illustrate the supposed case?—and perhaps be unsuccessful at last.

Again, many farmers wish to purchase in the fall young stock to keep over winter, generally heifers expected to calve in the spring. Heretofore, when cattle travelled on foot in droves to the Brighton market, they came so near their doors as to present a good opportunity for such farmers to make their purchases. But now live stock is mostly transported to the large markets by the rail cars, and there is hardly any alternative for the farmer to make his purchases, but at these distant markets. Were local fairs or market days established, then there would doubtless be droves of cattle purchased at the large markets at Cambridge and Brighton, and driven down to such fairs to supply the demand there. The farmer could then have his choice of such stock and at a price that while it would leave a fair profit to the drovers, would be less than he could afford to pay at a distant market. This would occur only in districts where there were not young animals enough raised, to supply the local demand.

It may be, too, that among the benefits to be derived from establishing regular fairs throughout the State, would be the encouragement they would thus indirectly give to stock husbandry, a branch of husbandry of late sadly neglected by us. The farmer is now tempted by the high prices offered, to sell his best calves at an early age to the butcher. And in fact their slaughtered carcasses are brought by the cars and by steamboats from New Hampshire, Vermont and Maine, to supply the Boston market. Thus the number of neat animals raised to maturity, has not kept up with the wants of the community, and as a consequence the price of beef animals, milch cows and working cattle, has experienced a most unprecedented increase. If the farmer could find purchasers for two-year-old heifers and steers, as readily as for calves and at corresponding prices, what should hinder his making the attempt to rear them? It will be said perhaps, that he has not the fodder to keep them over winter in any numbers, without encroaching on the feed of his other

stock. Now here is just where he should rouse himself to more enterprise to meet this want, especially by the cultivation of root crops. It is remarkable what immense burdens of carrots, ruta-bagas, mangold wurzels and sugar beets, can be raised on small plots of well-manured land, and with no more skill and labor than are required in the cultivation of a corn crop. The turnip culture is often said to be the foundation of modern British husbandry. Why? Because it enables the farmers of Great Britain to raise and keep a much larger number of animals —both neat stock and sheep—than they would otherwise possibly be enabled to do, and by this means to increase the manure heaps by which to augment the capacity of the soil for future crops. We have talked a great deal about the benefits of the root culture; it forms one of the standing topics of cattle show addresses, but it has made but slow progress among us. If we would once set about in good earnest and begin to rear young stock, we should know by actual experience the inestimable value of roots for winter feeding, and should help introduce into more general practice their culture. And the prospect of a home demand for young stock, such as would spring up from the establishing of market-days, would certainly tend to this desired result.

Again, there is a growing demand and at high prices, for good milch cows, especially for those giving rich milk, well adapted for the table and for butter. Let a regular market day be established in their neighborhood, and an additional inducement would be offered to farmers to raise their most promising heifer calves, by the certainty of finding purchasers of their cows just as soon as they were ready for sale; and the competition of a full attendance of purchasers would most likely create brisker sales and higher prices than would otherwise be had for them. The great question which is the best breed of cows for dairy purposes—if indeed there be one—would after a time be in a fair way to be settled. If the Jersey or the Ayrshire breed be the best adapted to our pastures and our climate, and the most to be depended upon for the dairy, it would assuredly be found out; for at a fair where dealers and farmers thus meet together, they would compare their experiences and make up a judgment accordingly. Or if a new breed of milch cows—pure natives perchance—should be originated

among us, that should meet all our requirements, that would then be the one to receive the most attention to propagate it in its purity. Why? Because quick sales, large prices and a certain market at our very doors, would operate as a stimulus to such stock raising, and it would be seen that it would pay, when we returned from the market with the proceeds.

So too we should raise our pigs, instead of being dependent, as for years we have been, on New York and Ohio for our supply, notwithstanding the disease which has proved of late so fatal to those brought from those States. The loss from this source to the farmers and drovers of Massachusetts has been immense. Can any one say, in view of such a loss, that its recurrence should not be guarded against by increasing the number of breeding sows, and making a home market for their litters by the establishing of regular markets for their sale? They can readily be taken to market in wagons fitted for the purpose, or they could be driven in droves, if grown to be shoats, and the supply, it is safe to predict, would not for a long time, if ever, exceed the demand. And here too, as in the case with milch cows, there would be greater inducements, by the establishing of such markets, to bestow more attention to breeding than has as yet been practised among us.

Let us come now to farm products other than live stock,—how would they be affected by the establishing of these fairs? Some products, such as hay for example, would hardly be offered for sale, unless it should be pressed in bundles so as to be made available for transportation. Wherever grains were grown in any considerable quantities, they would rarely fail of finding purchasers at these fairs, for it is well known that the supply of these has not for a long time been at all adequate to the wants of the State. And it is equally well known that the Indian corn and the rye raised in New England, is far superior in quality to that imported from the Middle and Southern States—for domestic consumption, indeed, no one having tasted the former would use the latter, unless from sheer necessity. Butter, cheese and eggs, articles that are now frequently sold at the door to travelling agents, or at country stores, and without any competition to enhance their price, would be brought to these fairs in sufficient quantities to attract purchasers for the

larger markets; and sales would be made at their full value and for ready cash payment.

In regard to apples, large quantities of which are some years raised in the State, the advantage of regular market days or fairs for their sale, would be very great. As they are a bulky article, their transportation to market is no trifling affair. Six or eight barrels are usually taken at a load in a one-horse wagon, requiring on an average thirty trips to sell a crop of two hundred barrels, besides the time consumed in finding purchasers. Now if the farmer were sure that on a particular day in the fall, dealers would attend the fair in his neighborhood, and make large purchases of this fruit for shipping or for re-sale at the larger markets, he could take with him samples of his different varieties, and thus dispose of his entire crop, to be delivered at the cars or in the city, as might be agreed upon. By this comparatively small outlay of time and money, his net profit would be vastly greater than it now is. In the same manner, onions and other vegetable crops might be disposed of with advantage, both to the seller and the buyer.

And here we are reminded of an incidental advantage to be derived from these fairs, and one by no means to be overlooked in forming a correct estimate of them. Some crops, such as the apple, for example, are extremely variable, being one year abundant in some parts and scarce in others; and another year, *vice versa.* Some crops too, such as the onion, are raised in large quantities, in some sections of the State, and not at all in other sections. Now an abundant supply of any commodity gluts the market, and often reduces prices to a ruinous extent. Hence, where there is an excess of these crops beyond the demand for home consumption, it could readily be disposed of to purchasers from a distance, who would be drawn to the local fairs by the knowledge of this very contingency.

Besides the opportunity thus afforded for traffic at these fairs, they would be attended with peculiar convenience to the farmer in hiring laborers. He is now put to great trouble and uncertainty in obtaining such as are needed—doubtless owing in part to the fact that native labor has been of late largely superseded by foreign. But even this labor cannot always be commanded at the time it is most wanted by him. He cannot spend much time in the busy season in riding round for

work-people, and unless they happen to offer themselves at his door, he must suffer for want of them. Now at the opening of the spring work, at haying and at harvesting, if the farmer could be sure of meeting at the fair in his neighborhood, a large number of men in want of work, of whom he could take his pick, it would assuredly be no small convenience both to himself and to the persons hired. From this arrangement, a scale of prices, which would be highly desirable, would soon be fixed for the different kinds of laborers, and as a consequence there would be more uniformity of wages paid by our farmers. And if it were deemed expedient, a registry might be opened for the names of the persons thus seeking employment, and of the place where they last worked.

But it would be difficult to specify in detail, all the benefits which might be expected to be derived from establishing regular fairs or market days throughout the State. We have endeavored to enumerate but a few of them ; sufficient, however, to give some definite, and it is to be hoped, favorable views in regard to them. Doubtless here, as in other new enterprises, many of the advantages would far exceed the most sanguine expectations, whilst others would in time spring up that were entirely unlooked for. Take for illustration our railroads. Many of us can remember with what distrust they were regarded by a large part of the community, when they were first proposed for consideration. The stage-coach companies thought that they should be ruined ; and the farmers reasoned very naturally that the general introduction of the iron horse, as a means of transportation, would diminish, if not destroy, the demand for hay and other provender. But how has it turned out ? The stage companies have become the proprietors of the omnibuses running from the various stopping places of the rail cars. And for the use of those omnibuses, and for drays, coaches and private vehicles, and more recently for horse railroads, the number of horses in the State, and their price too, has probably doubled or trebled since the first rail was laid here, and the consumption of hay and oats has increased in a corresponding ration. Other interesting particulars will readily suggest themselves, illustrative of the incidental benefits of railroads, equally unforseen by their projectors and the community at large.

Let us now consider some of the objections that would be likely to be urged against the establishing of these fairs. It may be said, perhaps, that they propose too great an innovation on the present modes of disposing of agricultural products, to meet with much favor from the farming community. We all know with what reluctance farmers quit long established habits and practices, and how slow they are to make any change in them. Nor can it be denied that a most radical change is here proposed to them, and one which needs to have a fair start given to it, in order to overcome the standing objections to every new enterprise. To take again for illustration the case of railroads. When they were first talked of, the conservative men on all sides cried out against this change from the long tried and well approved modes of travel on the public highway. Those in any way interested in keeping things as they were, joined in the cry of "let well enough alone."

"But," says J. R. Williams, in an address before the Michigan State Agricultural Society, in 1850, when speaking of the old maxim that it is best to "let well enough alone," "it depends upon what 'well enough' means. As a maxim for a farmer it is pernicious. I hold in my hand two peaches. They grew upon trees which sprung from different pits of the same original tree. This large, blushing, richly-tinted, melting, thin-skinned, and small-stoned peach, is cultivated fruit. The small, woolly, tough-skinned and large-stoned peach, is the natural fruit, the 'let well enough alone' kind. I hold in my hand two apples, plucked from the same tree, one from a grafted, and one from a natural branch. One is the cultivated fruit, the other is the 'let well enough alone' kind. You perceive the distinction is as marked in the apple as in the peach. These are a type and fit illustration of progress and perfection in every branch of agriculture."

Notwithstanding the doubts of some, and the gloomy forebodings of others, the railroads were started and they who at first were most opposed to them, have been as ready as any to avail themselves of their benefits. So it would most probably be with these fairs; once started under favorable circumstances, they would give the best proof, by actual experiment, of their superiority over the present modes of selling and buying agricultural products. It would doubtless take time to

turn the current of trade into the new channels; but it would come, and the wonder would then be that the work had not been undertaken long ago.

It may be objected to these fairs, too, that they are not adapted to the habits of our people; that they partake too much of the character of holidays to be favorably received by them. But, it may be asked, how can this be determined without making the trial? In fact, it is in our power to give to them just such a character as we please. And should they become the means of inducing our farmers to spend a few hours occasionally in innocent and rational recreation, it may well be questioned whether the effect on their minds or morals would be at all injurious. It is the bow that is always bent that looses its elasticity, so the mind that is constantly intent on business and is never unstrung in social intercourse, loses its quickness of perception and its keenness of judgment; the heart that is never warmed into a genial glow of cheerfulness and pleasure, becomes cold and torpid. We should not be sorry to see as an effect of these fairs, more of the "good humor and all social affections and generous sentiments among the people," which the constitution specially enjoins upon legislators and magistrates in all future periods of this Commonwealth to countenance and inculcate.

Other objections might be raised to an enterprise so novel and untried as this would be among us. It is not necessary, however, to go into the further consideration of them for the reason that we cannot conceive of any sufficiently serious to require it. It should be borne in mind that the practical question is, not whether there are any evils to which these fairs might be liable, but whether they would be overbalanced by the positive benefits resulting from them. And this question could best, and perhaps only, be settled by an actual experiment of establishing them. And this brings us to the consideration of the best practical method of commencing and continuing these fairs throughout the State, so as to create new markets for the farmer.

And first it would be highly desirable, if not essential, that the farmers of the Commonwealth should be more fully informed as to the working of these fairs, and the advantages to be expected from them, in order to their co-operating with

earnestness and energy in their establishment. If it be true—and of this it is too late to doubt—that "where there is a will there is a way," the first great object in starting this enterprise is to secure the hearty good will, the intelligent and the united will, of the farming community in its favor. This, we are persuaded, is vital to its success. With this view, meetings might be held in the winter months in the different counties, the question fully discussed and a vote taken upon it. A series of such meetings might be held in different parts of the same counties, until the subject was brought before its whole agricultural population and their minds were known, with some degree of certainty, upon it. And in addition to this, circulars might be issued by the State Society, to be distributed through the county societies, setting forth the advantages of these fairs, and requesting the opinions of those to whom they were addressed, as to the practicability of establishing such fairs in their several neighborhoods, and the times and places at which they could best be held, also desiring each person to say what part, if any, he would take in giving them his support by his attendance and otherwise. When all this had been done, we should be in a position to judge whether it were advisable to proceed in establishing the fairs, or not. If the whole popular current was decidedly against it, or such a degree of apathy and indifference was manifested in respect to it as to make its success highly doubtful, then we should say that it was best to wait for "the good time coming," rather than to attempt to force its advent. But if the public sentiment, as thus ascertained, were favorable to the undertaking, especially if a certain enthusiasm were excited in the subject, start it then, by all means, and the sooner the better. There need be but little formality about it. Let individuals in the several neighborhoods near the fair, associate themselves together by agreeing to attend, either to buy or sell, one taking this and another that article, and all determining to lend his aid and encouragement to it. One enthusiastic person in a neighborhood,—an energetic, persistent man, not easily deterred by trifles, one that sees few or no obstacles in the way when a good enterprise is started; or, seeing them, summons fresh pluck to surmount them,—will certainly succeed in enlisting the hearty good-will and co-operation of nearly all with whom he comes in contact. With book

and pencil in hand let him call on his neighbors and talk over the matter freely with them, and then note down what this one and that will do to help on the fair, specifying the articles they would severally agree to carry to it. The power of associated action and the force of example, would in this way operate quietly but effectually. A few such men—young men, if they can be enlisted—will act like leaven to leaven the whole mass.

There need be no regulations made and published as to the buying and selling, not even that the sales shall be for cash payments, which would certainly be the most desirable mode of trade. The fair would be the farmers' exchange—just as the merchants have their exchange in the city—where they meet to transact business, and self-interest and mutual convenience make the bargains. Neither are there needed any public yards or buildings for the display of animals or other products of the farm; but they would be offered for sale at particular points, which would soon become well known to the public. On the 23d of June last, Sanford Howard, of the Boston Cultivator, attended a cattle fair at Kilmaurs, in Scotland. In a letter published just afterwards in that paper, he says: "there were there about four hundred head of cattle, mostly Ayrshire cows and heifers, the greater part of which changed hands, although the market was dull. They were collected in the principal street in the village, the lots of the different owners being kept separated by men and dogs. The purchasers looked over the animals, and having decided on the ones they wanted, and asked the price, made offers, at the same time extending their hands. If the offers were accepted, the parties shook hands and that consummated the transaction." The whole is a very simple affair—as simple as Columbus making the egg stand on its end—if we would but take hold in earnest and determine to have it succeed. Only make a beginning by collecting together on a fixed day and at a fixed place, agricultural products and men in sufficient numbers, and the market is established. The success of one such day would be almost sure to command success on the next, and after a few such days the market day would become a permanent and popular institution, and would be noted in the almanac, as the different terms of the courts are noted.

Another important question, and one requiring much care and deliberation in deciding it, is, how often and where shall these fairs be held? It is clear that this must be left with some body of men, in whom the public have confidence. The different agricultural societies that receive the bounty of the Commonwealth, and are required to make an annual return to it of their transactions, might be requested to take upon themselves this duty. Composed as these societies very generally are of farmers, they have the confidence of the farmers, and they can best fix the times and places of the fairs, with the proper discretion. By their trustees, or by committees chosen for the purpose, they might exercise the necessary power with regard to the whole matter, with but little danger of its being abused. They should in the first place, map out the county, and then select such points as would best accommodate the population, having reference to railroad and other facilities. The railroad companies could well afford to encourage the fairs, by charging but half price to those who pass over their roads to their market. To make this matter more specific, let us take for example the County of Essex—that being the county with which the writer is most familiar—and let four towns be fixed upon as near as may be to its four corners, as the places where monthly fairs or market days shall be held throughout the year. Such four places might be Danvers, (at the Plains,) Ipswich, Newburyport, and North Andover, (at Sutton's Mills.) Three of these towns have at least two railroads running directly to or through them; and one, Ipswich, has the Eastern Railroad passing through its centre. Having settled upon these towns and the points in them, at which the market could best be held, on the first Wednesday in January let a market be held at Danvers, due notice having been given to that effect. On the second Wednesday in January let a market come off at Ipswich; the third Wednesday at Newburyport, and the fourth Wednesday at North Andover, and so go through each month in the year, observing the same order as to the days. In this way it would soon be known that the first Wednesday of every month was market day at Danvers; and so of the other towns, they would always have the same Wednesday in the month for their market day. At first these markets might not be so fully attended, but still they should be observed, rain or

shine, brisk times or dull. As the fairs are started, in respect of place and day, so they should be continued, for the reason that a change would be difficult; but more especially that the habit of attending a particular market at a regularly recurring time, would thus become fixed in the life of the farmer. And in order to accommodate the whole county by a larger display of stock, let some central town, such as Topsfield or Georgetown, having good railroad facilities—be the place for holding a market day for neat stock and horses in the spring and fall, the first Friday in May and October being suitable days for that purpose, and not interfering with the other markets.

And in order to encourage this whole enterprise in its infancy, it might be advisable for the agricultural societies or public spirited individuals to offer premiums for certain farm products, that cannot so well be presented at the regular cattle shows, and do not receive any encouragement from them. For example, the best poultry in all its varieties, dressed for the market, mutton, pork, veal and other meats, might thus be noticed. The best lot of honey and eggs, of butter and cheese, of cranberries, quinces and apples, and of fruits and vegetables generally, might also receive the fostering aid of the societies. The advantage of this mode of bestowing premiums is, that it would be the best lot of a given product, as prepared for market and exposed to sale, that would receive them, and not the best specimens, culled and fitted for parade, as is too often the case at our fairs.

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TO THE ABSTRACT.